Draft
November 1985

Environmental Impact Statement

JAMES CREEK COAL

Preference Right Lease Application

U.S. Department of the Interior
Bureau of Land Management
Craig District, Colorado

IN REPLY REFER TO:

United States Department of the Interior

1792C

BUREAU OF LAND MANAGEMENT
COLORADO STATE OFFICE
2020 ARAPAHOE STREET
DENVER, COLORADO 80205

Dear Reader:

Enclosed for your review and comment is the Draft James Creek Environmental Impact Statement (EIS), which has been prepared by the Bureau of Land Management.

There will be a 90-day public comment period from November 22, 1985, to February 24, 1986. Where applicable, these comments will be incorporated into the Final EIS. Comments should be sent to:

Bureau of Land Management
Greg Goodenow, Project Manager
455 Emerson Street
Craig, Colorado 81625

Public meetings will be held as follows:

January 15, 1986, 7:30 p.m.
White River Resource Area Office
2 miles west of Meeker on Highway 64
Meeker, Colorado

January 16, 1986, 7:30 p.m.
The Grand Junction Hilton
743 Horizon Drive
(Horizon Drive and I-70)
Grand Junction, Colorado

Oral comments will be accepted during the meetings (presentations should be limited to 10 minutes), and written comments will be accepted through February 24, 1986.

If there is adequate interest, a public workshop will be held to discuss the impacts in more depth. Any interested parties should contact Greg Goodenow at the above address, before December 20, 1985.

Please keep this Draft EIS for use in conjunction with the Final EIS. If only minor modifications are required, the Final EIS will incorporate this document with any necessary modifications and corrections, a record of public comments, and the responses to these comments.

Thank you for your interest in the federal coal management program.

Sincerely,

Kannon Richards

Kannon Richards
Colorado State Director

Enclosure

JAMES CREEK COAL PREFERENCE RIGHT LEASE APPLICATION ENVIRONMENTAL IMPACT STATEMENT

DRAFT (X) FINAL ( )

The United States Department of the Interior, Bureau of Land Management, in cooperation with the Office of Surface Mining Reclamation and Enforcement.

Type of Action: Administrative (X) Legislative ( )

Abstract: This Draft Environmental Impact Statement (DEIS) describes and analyzes the site-specific and cumulative environmental impacts of the proposed leasing and development of Preference Right Lease Application (PRLA) C-0126998 located about 9 miles northeast of Meeker, Colorado, in Rio Blanco County, and in the Craig District, Bureau of Land Management.

This PRLA, which covers 5,100 acres, is held by Consolidation Coal Company (Consol). Consol has proposed a 10-million-ton-per-year surface mine, in conjunction with an adjacent Federal lease, as the likely development of the PRLA, should the lease be issued. It is around this proposal, which includes a mitigation and reclamation plan, that the analysis is centered.

The two main issues in the document are local hydrology and wildlife, primarily elk. Although impacts to elk can be mitigated, to an insignificant level, impacts to hydrology remain. Some economic impacts may occur with or without leasing and development of the PRLA.

The Alternatives considered in this EIS include:

No Action

Withdrawal/Just Compensation

Lease Exchange

Proposed Action (Consol's Current Proposal)

BLM's Preferred Alternative

Comment Period: A public comment period will be held from November 22, 1985 to February 24, 1986. Where applicable, these comments will be incorporated into the Final Environmental Impact Statement. Comments must be received no later than February 24, 1986.

For further information, contact:

Greg Goodenow, Project Manager
Bureau of Land Management
Craig District Office
455 Emerson Street
Craig, Colorado 81625
Telephone: (303) 824-8261

DRAFT

JAMES CREEK COAL PREFERENCE RIGHT LEASE APPLICATION

ENVIRONMENTAL IMPACT STATEMENT

PREPARED BY:

BUREAU OF LAND MANAGEMENT
U. S. DEPARTMENT OF THE INTERIOR

COOPERATING AGENCY:
OFFICE OF SURFACE MINING
RECLAMATION AND ENFORCEMENT

Kannon Richards

KANNON RICHARDS
STATE DIRECTOR
COLORADO STATE OFFICE

SUMMARY

This enviromental impact statement (EIS) describes and analyzes the environmental impacts of leasing and subsequent development of a coal Preference Right Lease Application (PRLA) located about 9 miles northeast of Meeker, Colorado, in Rio Blanco County. It also documents a BLM land-use planning decision for the PRLA and several adjacent Federal coal leases. This PRLA (C-0126998) lies in the Bureau of Land Management's (BLM) White River Resource Area of the Craig District, Colorado. The proposed development would include portions of the PRLA and an adjacent Federal lease (C-093713). (This development area is referred to as the project area throughout this document.)

The PRLA covers 5,099.31 acres, with elevations ranging from 6,640 to 8,673 feet. Narrow valleys and hills with steep slopes characterize the area. Land uses include 5,081 acres for rangeland, 15 acres for agricultural land, and about 3 acres for residences.

About 85 percent of the PRLA surface estate is non-federally owned. Of this, some 2,250 acres are part of the Jensen State Wildlife Area, owned by the Colorado Division of Wildlife. The rest of the non-federally owned surface estate is held by private individuals. The Federal government owns all mineral rights in the project area.

Consolidation Coal Company (Consol) has proposed mining portions of the PRLA and an adjacent Federal lease. The total area to be disturbed would be about 5,200 acres over 30 years. This includes actual mining and permanent facilities—shops, bathhouse, etc. The mine would produce 10 million tons of coal per year during full production and 280 million tons over the life of the mine. Approximately two thirds of the production or 190 million tons would come from the PRLA.

Because elk use the area intensively, and much of the area is owned by Colorado Division of Wildlife (CDOW), Consol has committed a comprehensive mitigative plan. In the opinion of the CDOW, mitigative measures currently proposed and others that may be identified through further requirements of a mine plan should reduce the impacts to elk to an acceptable level.

Through public meetings and BLM's preliminary analysis, resources and areas of concern were identified for inclusion in this EIS.

Alternatives considered in this EIS include:

- No Action
- Withdrawal/Just Compensation
- Lease Exchange
- Proposed Action (Consol's Current Proposal)
- BLM's Preferred Alternative

There is very little difference between Consol's proposed action and BLM's preferred alternative because of resolution of conflicts among Consol, BLM, and CDOW. Consol has altered its original proposal to incorporate wildlife and environmental concerns.

The conclusion of the analysis in this EIS is that most significant impacts could be avoided through the protective measures committed to by Consol. Additional measures identified by BLM in the Preferred Alternative would reduce the probability of impacts even more, as shown in table S-1.

Permitted production for northwest Colorado (29 million tons per year) far exceeds actual demand and actual production (about 9 million tons per year in 1984). Coal already under lease far exceeds permitted production levels and projected production levels of 16-20 million tons per year by the year 2000.

In conclusion, leasing and development of this PRLA will not affect coal production in northwest Colorado. Simply stated, the market and resultant production will be about the same (16-20 million tons), with or without Consol's development. If Consol gets the lease and subsequently develops the area, it will capture a share of the market and will contribute to regional impacts. If Consol does not develop the project, regional production will be unaffected, and the level of regional impacts such as employment, encroachment on wildlife habitat, increased population, etc., will not be affected.

TABLE S-1
COMPARATIVE ANALYSIS OF IMPACTS ASSOCIATED WITH THE ALTERNATIVES

Resource	*No Action/No Development Alternatives*	*Consol's Proposed Plan*	*BLM's Preferred Alternative*
Wildlife	No impacts	Alteration of water source, displacement of up to 300 elk (mitigated to an acceptable level)	Alteration of water source, displacement of up to 300 elk (mitigated to an acceptable level)
Soils	No impacts	Alteration of natural soil system (probably not significant)	Alteration of natural soil system, productivity protected (not significant)
Geology & Minerals	No impacts	Development of 280 millon tons of coal	Development of 280 million tons of coal
Surface Water	No impacts TDS of 800 mg/l	Potentially significant alteration of quantity & TDS of 2,000-2,900 mg/l	Potentially significant alteration of quantity & TDS of 2,000-2,900 mg/l
Groundwater	No impacts TDS of 800 mg/l	Potentially significant alteration of quantity & TDS of 2,000-2,900 mg/l	Potentially significant alteration of quantity & TDS of 2,000-2,900 mg/l
Alluvial Valley Floor	No impacts	No significant impact necessarily anticipated	No significant impact necessarily anticipated
Vegetation	No impacts	Possible long-term loss of wetlands and meadows—about 152 acres of disturbance due to the rail line—not regionally significant	Loss of wetlands and meadows reduced—about 152 acres of disturbance due to the rail line—not regionally significant
Cultural Resources	No impacts	Potential loss of undiscovered sites (unknown significance)	Potential loss of undiscovered sites reduced (unknown significance)
Paleontological Resources	No impacts	No known significant impacts, but potential exists	No known significant impacts, potential for impact reduced
Land Use/Grazing	No impacts	Loss of short-term forage—not regionally significant, major change in one ranching operation	Loss of short-term forage—not regionally significant, major change in one ranching operation
Recreation and Visual	No impacts	Loss of recreational opportunities and quality of the setting (not regionally significant)	Loss of quality of the setting (not regionally significant)
Social/Economic	Increased population in Meeker and Craig, significant impacts	Increased population, no significant impacts above No Action/No Development	Increased population, no significant impacts above No Action/No Development
Other Resources Air Quality, Climate, Wilderness, Threatened and Endangered Plants, Land Use Rights-of-Way & Leases, Noise, and Transportation	No impacts	No significant impacts	No significant impacts

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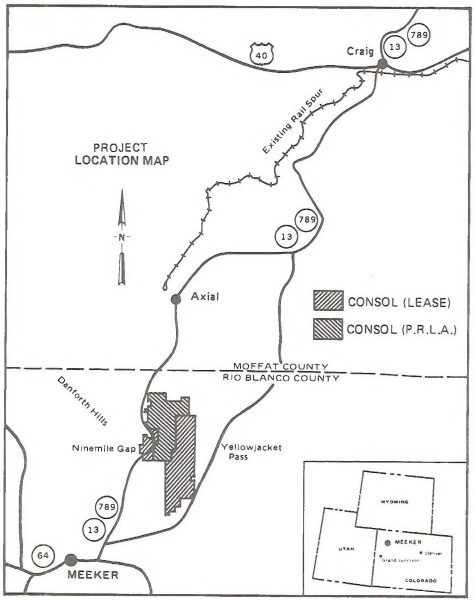
CHAPTER 1
INTRODUCTION

CHAPTER 1—INTRODUCTION

PURPOSE AND NEED

This Preference Right Lease Application (PRLA) C-0126998 is held by Consolidation Coal Company (Consol) (map 1-1). As required by regulations pertaining to federally owned coal (43 CFR 3400), the Bureau of Land Management (BLM) is processing this PRLA (considering issuing a lease to Consol). This Environmental Impact Statement complies with the National Environmental Policy Act and documents a land-use plan amendment, as required in order to process the PRLA. If the lease is issued, Consol has proposed constructing a 10-million-ton-per-year surface mine. The analysis in this EIS is based on Consol's proposal.



Map 1-1 PRLA General Location Map

PREFERENCE RIGHT LEASE APPLICATION PROCESSING

The Mineral Leasing Act of 1920 provided for the issuance of coal prospecting permits in unclaimed, undeveloped areas. Upon demonstrating that commercial quantities of coal had been discovered under terms of the permit, a noncompetitive coal lease could be issued for all or part of land in the permit under this act.

The Federal Coal Leasing Amendments Act of 1976, however, repealed the Secretary of the Interior's authority to issue coal prospecting permits and, consequently, noncompetitive coal leases. Subsequent regulations and policy were then developed to process the valid prospecting permits that were issued before the 1976 act. Processing requirements consist of three major steps: 1) the initial showing—the permittee identifies the presence of commercial quantities of coal, which includes coal quantity and quality data, the location of proposed development and mining operations, and mining methods, and applies for a Preference Right Lease (PRLA); 2) the environmental analysis—BLM prepares an environmental assessment or environmental impact statement on the applications; and 3) the final showing—the applicant shows its expectation that revenues generated from the coal sales will exceed the cost of extracting, transporting, and marketing the coal, as well as the costs of mitigating significant environmental impacts associated with mining and reclamation.

This environmental impact statement will satisfy the second step (environmental analysis) of the processing procedure. When preparing the final showing, the applicant will consider the costs of complying with the stipulations and mitigative measures identified in this document.

BLM's Craig District Office prepared an environmental assessment (EA) in 1980 that addressed Consol's initial showing. Information in the EA, along with the amended initial showing that was subsequently filed by Consol, was used in determining that an EIS was needed. This was done so that any significant impacts of Consol's second proposal, as described in its amended initial showing, could be fully analyzed.

AUTHORIZING ACTIONS AND AGENCY INVOLVEMENT

The Bureau of Land Management will, upon completion of this EIS, request a final showing from Consol. BLM will use this analysis to determine what stipulations and mitigative measures should be placed in the request for final showing. The decision, as well as whether or not Consol has met the final showing requirements as outlined in the regulations (43 CFR 3430), will be made by BLM's Colorado State Director.

The State Director will also make a land-use planning decision on the application of the unsuitability criteria, for which recommendations are contained in Appendix A. If Consol is successful in its final showing, the State Director may recommend an exchange or legislative action (specifics are discussed in Chapter 2), through BLM's Director, to the Secretary of the Interior, or BLM may issue a lease and Consol could develop a surface mine within the lease.

Because the Office of Surface Mining (OSM) Reclamation and Enforcement Division has expertise in hydrology and reclamation and jurisdiction in approval of any mine plan that might result from BLM's leasing decision, OSM has agreed to cooperate in preparing this EIS.

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) gives OSM primary responsibility to administer programs that regulate surface coal mining operations on Federal lands and the surface effects of underground coal mining operations on Federal lands. Pursuant to Section 503 of SMCRA, the Colorado Mined Land Reclamation Division (MLRD) developed and the Secretary of the Interior approved a permanent program authorizing Colorado MLRD to regulate surface coal mining operations and surface effects of underground coal mining on non-Federal lands within the state of Colorado.

In September 1982, pursuant to Section 523(c) of SMCRA, Colorado MLRD entered into a cooperative agreement with the Secretary of the Interior authorizing Colorado MLRD to regulate surface coal mining operations and surface effects of underground mining on Federal lands within the state.

Pursuant to the cooperative agreement, Federal coal lease holders in Colorado must submit permit application packages to OSM and Colorado MLRD for proposed mining and reclamation operations on Federal lands in the state. Colorado MLRD reviews the packages to ensure that the permit application complies with the permitting requirements and that the coal mining operation will meet the permanent program's environmental performance standards; if it does comply, Colorado MLRD issues the lessee a state permit to conduct coal mining operations. OSM and other Federal agencies reviews ensure that the permit application packages comply with the coal lease, the operation and reclamation requirements of the Mineral Leasing Act of 1920, as defined in

SMCRA; the National Environmental Policy Act of 1969; and other Federal laws and their attendant regulations. OSM recommends approval, with conditions, or disapproval of the mining plan contained in the packages to the Assistant Secretary for Land and Minerals Management. BLM and the surface-managing agency (if other than BLM) must concur with the recommendation, based on their review of the permit application package.

Colorado MLRD enforces the state and Federal environmental performance standards and permit requirements during the mine's operation and has primary authority in environmental emergencies. OSM oversees this enforcement. BLM has authority in emergencies where Colorado MLRD or OSM inspectors cannot act before significant environmental harm or damage occurs.

PRLA SPECIFICS

The PRLA (C-0126998) covers 5,099.31 acres in the James Creek drainage, about 9 miles northeast of Meeker, Colorado. The area is within the southeast part of the Danforth Hills Coal Field. The coal deposits occur in the Williams Fork Formation of the Upper Cretaceous age.

Based on drilling conducted between 1966 and 1976, Consolidation Coal Company's (Consol's) July 1, 1977, initial showing report identified 14.9 million tons of underground minable reserves in seven beds and 22.2 million tons of surface minable reserves in three beds.

Consol submitted an amended initial showing on September 27, 1982. It identified 665.8 million tons of surface recoverable reserves in 19 beds (737.2 million tons of minable reserves) in the entire PRLA.

Consol's subsequent supplement to the 1982 amended initial showing, (which reanalyzed the reserve data and took pit configuration and mine engineering into account), states that Consol would recover 380 million tons from the northern half of the PRLA and an adjacent Federal Lease. Consol proposed an advancing pit surface mine that would extract coal from the 19 beds. The proposed mine life was 40 years.

In 1984, following the elk mitigation study, Consol revised its proposal so that only 280 million tons would be recovered through this mining operation. The mine life was shortened to 30 years, and the areas that had made up the last 10 years of mining in the supplement were identified as elk mitigation avoidance areas. Of this 280 million tons, about 190 million tons would be from the PRLA.

THE ENVIRONMENTAL IMPACT STATEMENT PROCESS

The process includes: scoping, draft environmental impact statement (EIS), public comment period, and final EIS.

Public participation has been solicited during the scoping process to help identify major issues and alternatives.

The draft EIS describes the existing affected environment. The document also discusses the environmental consequences of different development alternatives identified through scoping and the Bureau of Land Management's planning process. Mitigative measures and special stipulations have been developed during this analysis. The alternatives identified for analysis include:

1. No Action
2. Withdrawal/Just Compensation
3. Lease Exchange
4. Consol's Proposal
5. BLM's Preferred Alternative, which incorporates additional mitigation into Consol's proposal needed to protect the environment.

A 90-day public comment period will be provided after publication of the draft EIS. The final EIS will incorporate any needed revisions or clarifications, comments on the draft EIS, and responses to comments.

After publishing the final EIS, BLM will allow a 30-day waiting period for decisions relating to the final EIS. This waiting period will also serve as a protest period for the planning amendment.

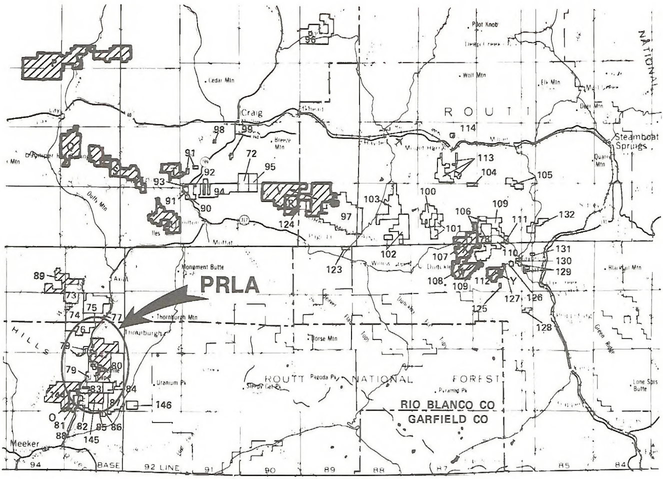
CONSIDERATIONS FOR ANALYSIS

This EIS addresses both site-specific and cumulative impacts. Site-specific impacts result directly from the proposal, and cumulative impacts result from the combined impacts of all projects within the area.

Projects that are considered for inclusion in the cumulative impact analysis for the various alternatives form a background or baseline against which to compare and contrast impacts of developing the PRLA. (See the Economics section in Chapter 3 for more details.)

RELATIONSHIP WITH OTHER COAL DEVELOPMENT AND LAND USE PLANS

Although Consol has other property in the area, no direct relationship exists between leasing and develop-



COLORADO

Ref. No.	COAL LEASES	Name of Mine	Lease No.
72	Utah International Inc.		C-07519
73	Utah International Inc.		C-0123475
74	Utah International Inc.		C-29225
75	Colowyo Coal Co.	Colowyo Strip	D-034365
76	Consolidated Land Development		C-29226
77	Consolidated Coal Co.		C-29224
78	Colorado Yampa Coal Co.	Energy No. 2 Strip	C-0128433
79	Consolidated Coal Co.		C-1546
80	Consolidated Coal Co.		C-093713
81	Northern Mineral Co.	Rienau No. 2	C-076713
82	Northern Mineral Co.		C-1545
83	Northern Mineral Co.	Northern No. 1,2,3	C-28358
84	Consolidated Coal Co.		C-093714
85	Northern Mineral Co.	Northern No. 1,2,3	C-28359
86	Consolidated Coal Co.		C-093715
87	Consolidated Coal Co.		C-093716
88	Northern Mineral Co.	Rienau No. 2	D-044240
89	Utah International Inc.		C-0123475
90	Empire Energy Corp.		C-30656
91	Empire Energy Corp.	Eagle No. 5 & 9	C-0126480
92	Utah International Inc.		C- 25948
93	Empire Energy Corp.	Eagle No. 5	D-056298
94	Utah International Inc.	Trapper Mine	C-07518
95	Utah International Inc.	Trapper Mine	C-079641
97	Hayden Gulch West Coal Co.		C-29217
98	Ferne M. James		C-064416
99	Utah International Inc.	Trapper Mine	C-813
100	Peabody Coal Co.		C-0114093
101	American Minority Mining Co.		C-29223
102	Materials Service Corp.	Seneca 2-W	C-081258

PREFERENCE RIGHT LEASE APPLICATIONS

Ref. No.	Applicant	Lease No.
144	Northern Minerals Co.	C-0126997
145	Northern Minerals Co.	C-0126999
146	P. Jensen & K. W. Miller	C-4275
147	Consolidation Coal Co.	C-0126998

Ref. No.	COAL LEASES	Name of Mine	Lease No.
103	Materials Service Corp.	Seneca W-W	C-081251
104	Peabody Coal Co.	Seneca 2	C-19885
105	Colorado Yampa Coal Co.		C-22676
106	Colorado Yampa Coal Co.	Energy No. 2 Strip	C-20900
107	Colorado Yampa Coal Co.		C-29220
108	Colorado Yampa Coal Co.	Energy No. 1 Strip	C-22644
109	Colorado Yampa Coal Co.	Energy No. 1 Strip	C-081330
110	Colorado Yampa Coal Co.	Energy No. 1 Strip	D-052547
111	Colorado Yampa Coal Co.	Energy No. 1 Strip	C-16284
112	Sunland Mining Corp.	Apex No. 2	D-046544
113	Peabody Coal Co.	Seneca No. 2	C-088199
114	Peabody Coal Co.		C-086654
123	Ruby Construction Co.	Sun Mine	D-051698
124	Franklin Real Estate Co.	Cardinal	C-012894
125	Prosper Lombardi, Jr.		C-23396
126	Sheridan Enterprises Inc.	Joe's Mine	C-052546
127	Sunland Mining Corp.	Apex No. 2	C-0127592
128	AMCA Coal Leasing, Inc.		D-051376
129	Gulf Oil Corp.	Edna	D-033327
130	Gulf Oil Corp.	Edna	D-053710
131	Gulf Oil Corp.	Edna	D-041478
132	Gulf Oil Corp.	Edna	C-021601

PROPOSED COAL LEASE TRACTS

P - Lay Creek
Q - Signal Butte
R - Peck Gulch(undrgrnd)
S - Horse Gulch
T - Bell Rock
U - Iles Mountain
V - Williams Fork
W - Little Middle Creek
X - Fish Creek
Y - Middle Creek

Map 1-2 Federal Coal Leases

0 5 10 15 20 Miles

SCALE

ment of this PRLA and Consol's or other companies' coal development in the area. Consol has indicated, however, that this PRLA probably would be developed with an adjacent Federal lease as one operation. Thus, Consol included development of an adjacent Federal lease in its proposal. Its proposal has been preliminarily reviewed by BLM, and it appears reasonable. Because of the high probability of development of the PRLA with an adjacent Federal lease, both are being fully analyzed in this EIS. Map 1-2 shows the PRLA, its location, and other Federal coal leases in northwest Colorado.

No BLM land-use planning decision has been made on the PRLA or the adjacent Federal leases. No recommendation was made on application of the unsuitability criteria (40 CFR 3460) in BLM's White River Resource Area Management Framework Plan Amendment (December 1981). This EIS provides the analysis for a land-use plan amendment. BLM will make the land-use planning decision after the final EIS has been completed and before any decision has been made on the proposed mining activity. It will cover the project area (PRLA and an adjacent lease), as well as several other adjacent Federal coal leases. It will apply the unsuitability criteria, make multiple use trade offs, and recommend areas as acceptable or unacceptable for leasing and development.

PUBLIC INVOLVEMENT

Public involvement occurred through the meetings and comment periods listed below.

Public comment period was held on the EA for C-0126998 from January 1 to February 1, 1982. A public meeting was held on January 27, 1982, 7:30 p.m., Fairfield Center, Meeker, Colorado.

Two sets of scoping meetings were held on this EIS. The first meetings were:

Place	*Date*	*Time*	*Address*
Meeker, CO	January 23, 1984	7 p.m.	BLM, White River Resource Area Office, 2 miles west of Meeker, CO
Denver, CO	January 24, 1984	2 p.m.	Ramada Foothills, Union and 6th Avenue, Lakewood, CO

Public comments were accepted from January 6, 1984, through February 6, 1984, (scoping period) on Consol's James Creek PRLA.

An information packet was also mailed out, as well as news releases to the local media.

The second set of scoping meetings were:

Place	*Date*	*Time*	*Address*
Meeker, CO	March 18, 1985	7 p.m.	BLM White River Resource Area Office, Meeker, CO
Craig, CO	March 19, 1985	7 p.m.	Craig District Office, 455 Emerson Street, Craig, CO

The 1985 public comment period ran from February 26 to April 18.

Four major areas of concern surfaced at these meetings:

1. Wildlife habitat, particularly for elk. This included short- and long-term impacts to winter range, calving areas, and migration routes.
2. Impacts to both surface water and groundwater resources in the area. This included the flow of James Creek and production of water from area wells.
3. The feasibility and effect of reclamation efforts.
4. Economic impacts to Rio Blanco and Moffat counties.

CHAPTER 2
ALTERNATIVES

CHAPTER 2—ALTERNATIVES

INTRODUCTION

The following alternatives have been developed and analyzed fully:

- No Action. Under this alternative the PRLA would not be leased or developed because Consol would not be able to meet final showing requirements.
- Withdrawal/Just Compensation. The Secretary of the Interior, exhausting all other authority to protect the environment, could request Congress to withdraw, purchase, or withdraw and purchase Consol's interest in the property. As with No Action, the PRLA would not be developed.
- Lease Exchange. A lease exchange could be negotiated for coal (congressional action), other minerals, coal lease modifications, or lease bidding rights of equal value. The PRLA would not be developed under this alternative either. Congressional authorization would be required for the coal lease exchange.
- Consol's Proposal. Consol's proposal calls for a maximum production rate of 10 million tons per year. Total production during the 30-year mine life would be 280 million tons. The proposal would include all mitigation and compliance with applicable laws and regulations. Complete discussions are provided in Appendixes B, C, and D.
- BLM's Preferred Alternative. The Preferred Alternative results from special mitigation added to Consol's current proposal.

To simplify the discussion of the impacts and alternatives and because the first three alternatives all result in no development of, and no impact on, the project area, they have been grouped together in the analysis. They are presented as the No Action/No Development alternatives.

Because the Proposed Action and BLM's Preferred Alternative result in the development of the PRLA, the EIS refers to them as Development alternatives, when appropriate.

Table S-1 (see summary) summarizes the impact of each alternative. Chapter 3, Affected Environment and Environmental Consequences, presents a full discussion of these impacts.

FORMULATION OF ALTERNATIVES

The alternatives reflect foreseeable regional development and the resultant impacts. Regional cumulative analysis was made as accurately as possible. Supply and demand for coal was the critical component of the analysis.

Supply and Demand

Because future production will depend on actual demand, BLM identified probable production levels and development in northwest Colorado. The following explains the methodology for this analysis.

Projected Demand for Northwest Colorado Coal

Four projections were analyzed to predict the demand for coal in northwest Colorado through the year 2000. The projections were supplied by: (1) Department of Energy, Energy Information Agency (1983); (2) Department of the Interior (1984); (3) State of Colorado, Geological Survey (1984); and (4) BLM Craig District (1985). The results predicted a demand for 16 to 20 million tons of coal from northwest Colorado by 2000. Based on current permitted production and the coal under lease, an ample supply is available to meet this projected demand (figures 2-1 and 2-2 and table 2-1).

Projected Development

Development projections were calculated by using activities selected from the Basic Activity System of the Planning and Assessment System (PAS) of the state of Colorado. The PAS was created to analyze the cumulative impacts of oil shale, coal, and other energy projects and basic industrial sector activities in the region. Private industry and local, state and Federal governments established and maintain a common base of methodology, data, and assumptions about future regional projects. All projected development assumed in this analysis has been extrapolated from this process, and all energy related projects have been considered.

CONDITIONS UNDER WHICH THE PRLA WOULD NOT BE DEVELOPED

If the applicant failed to demonstrate that commercial quantities of coal were discovered and could be developed economically within environmental constraints (43 CFR 3430), the PRLA would be rejected, a lease would not be issued, and the area would not be mined.

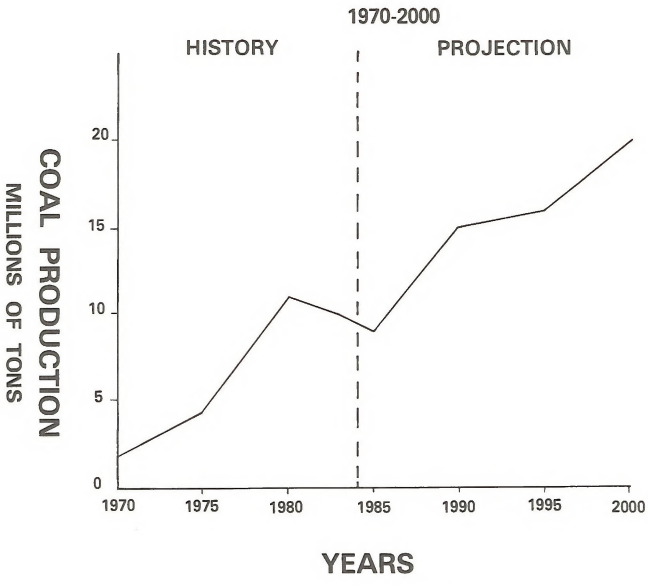


Figure 2-1 Northwest Colorado Coal Production

TABLE 2–1
DISTRIBUTION OF COAL PRODUCTION IN NORTHWEST COLORADO, ALL ALTERNATIVES

	1985		*1991*		*1995*		*2000*	
	Consol PRLA	*Other* Mines[1]	*Consol* PRLA	*Other* Mines	*Consol* PRLA	*Other* Mines	*Consol* PRLA	*Other* Mines
No Development	0	9.2	0	15	0	16	0	20
Development 10 mty[3]	0	N/A	10	5	10	6	10	10
Total Production	1985	9.2	1991[1]	15	1995[2]	16	2000[2]	20

[1] Other mines includes all other existing and proposed mines in Northwest Colorado.

[2] Time frames were developed based on Consol's proposal

[3] mty = million tons per year

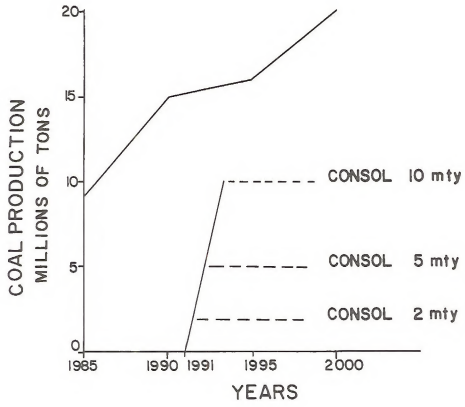


Figure 2-2 Coal Production in Northwest Colorado with PRLA

If the applicant could demonstrate that coal could be developed economically, but the Secretary determined that it would not be in the public interest to allow coal leasing on the PRLA area, the following two alternatives could be implemented.

1. A lease exchange could be negotiated for coal, a coal lease modification, other minerals, or lease bidding rights of equal value. Congressional authorization would be required for the coal lease exchange. If an exchange became desirable and the applicant and the department agreed on a proposed tract for exchange, an appropriate environmental analysis of the impacts of leasing that tract would be prepared. Because no exchanges have yet been proposed for this PRLA, no analyses have been developed.
2. The Secretary of the Interior, lacking other authority to protect the environment, could request legislation from the Congress to purchase Consol's interest in the property, if a coal lease exchange proposal were determined to not be feasible by the Secretary or if the applicant declined to accept an exchange offer by the Secretary.

Under each of the alternatives—1) no action, 2) exchange, or 3) withdrawal/compensation—the environmental impacts on the PRLA area would be the same; no environmental impacts on the PRLA area would occur.

CONDITIONS UNDER WHICH THE PRLA WOULD BE DEVELOPED

The conditions that must be met before the area could be mined include both regulatory (items 1-3) and economic (item 4).

1. The applicant must meet all the conditions and stipulations of final showing, and demonstrate environmental damage can be avoided, or provide acceptable mitigation.
2. The Bureau of Land Management would have to issue the lease.
3. The Office of Surface Mining and Colorado MLRD would have to approve the Permit Application Package.
4. Based on economic conditions and its share of the regional market, Consol could mine up to 10

million tons of coal per year. It would have to capture a large share of the local coal market, however, to compete effectively.

Appendix B contains copies of the laws mitigating coal related impacts and a list of agencies responsible for administering these laws.

NO ACTION/NO DEVELOPMENT ALTERNATIVES

These alternatives assume that if the PRLA was not developed, increases in coal production through 2000 would be allocated to existing regional coal mines, depending on market conditions. Under current conditions, enough coal is available in existing permitted mines for production of up to 29 million tons annually. Production in 1984 met a demand for 9.2 million tons. Demand by 2000 is projected to be between 16 and 20 million tons (figure 2-1) and an ample supply appears available to meet the projected demand. Under these alternatives, any additional coal output would be handled by existing coal mines and would not include the Consol PRLA. See table 2-1 and figure 2-2 for the distribution of coal production under this and other alternatives.

If Consol did not develop the PRLA, any present trends or conditions of the renewable resources would continue.

CONSOL'S PROPOSED ACTION ALTERNATIVE

The evolution of Consol's surface mining proposal, from initial to current (including the mitigation plan, Appendix D) is presented as follows.

Initial Surface Proposal

Consol made this development proposal in 1984. It reflects mine development and some mitigation and includes both the PRLA and adjacent Federal lease C-093713. Since 1984, Consol has refined its proposed mitigation, based on Camp, Dresser, and McKee's (CDM's) elk study and discussions with BLM and the Colorado Division of Wildlife.

The initial proposal that Consol submitted to BLM requested a 10-million-ton-per-year mine, with a mine life of 40 years. This initial proposal is outlined below. Consol provided both the discussion and map 2-1:

Consolidation Coal Company, 1984 Meeker Mine Plan

In January 1984, Consol's Central Engineering Group developed a mine plan for the Meeker PRLA based on the following goals:

1. Maximum economic use of the PRLA and surrounding Federal leases.
2. A continuous, 10-million-ton-per-year surface mine for up to 40 years, as the surface minable reserve allowed.
3. Placement of the support facilities and structures to provide for the most economical operation of the surface mine.

No specific environmental constraints were identified for this plan, except minimizing disturbance to the James Creek channel and floodplain.

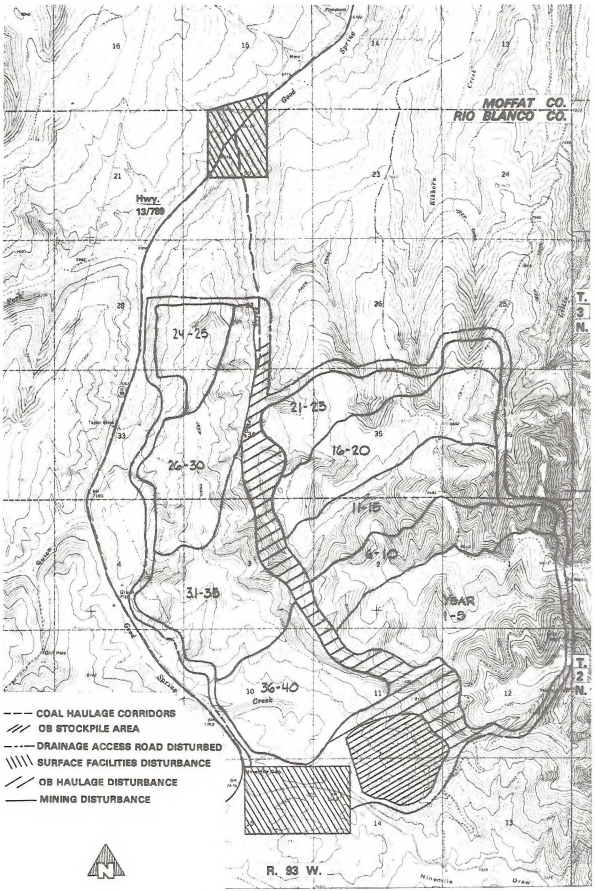
The resultant mine plan is illustrated in map 2-1. Production would increase by 2 million tons per year until mining year 5. At that time the production rate of 10 million tons per year would be achieved. This rate would be maintained through mining year 40, the final coal production year. The overburden stockpile would be located at the headwaters of Good Spring Creek, and a portion of the stockpile would become permanent following backfilling of the final pit. Because of its gentle terrain, highway access, ease of access, and the most direct access to the mining areas, support facilities would be located in the Ninemile Gap area. Two transportation routes, shown in map 2-1, were considered viable. One would be from James Creek to a loadout near the confluence of James and Good Spring creeks. The other would be from the Ninemile Gap area, with the railroad extended to the same area. This railroad option would be feasible if a side valley cut, starting near the confluence of Elkhorn and Good Spring creeks, was used. This plan involves mining approximately 368,000,000 tons of coal over the 40-year reserve life. This plan was presented at the January 1984 public scoping meeting.

Consol's Revisions to Accommodate Wildlife Concerns (which have been incorporated into its Current Proposal)

The review of possible mitigation opportunities for elk migration areas, described in the Meeker PRLA Elk Mitigation Feasibility Assessment (CDM 1984b), indicated that avoidance of the Ninemile Gap area may be the most technically sound approach to mitigation, and one achievable through mine planning.

As a result, new mine planning goals were added to the original list. These goals included:

1. Deleting the Ninemile Gap transportation option.
2. Moving stockpiles, facilities, and access from Good Spring Creek and Ninemile Creek watershed "behind" the ridge separating the headwaters of James Creek and the headwaters of Good Spring Creek.



Map 2-1 Consol's Initial Surface Proposal

3. Stopping mining on the ridge between Good Spring Creek and James Creek to avoid interfering with elk movement in the Good Spring Creek valley or spillover into the Hole-in-the-Wall and West Fork Good Spring Creek calving/rearing areas.

This would eliminate the last 10 years of mining (approximately 100 million tons of coal) and would provide less than optimum locations for the overburden stockpile and support facilities.

Construction costs to prepare suitable facility areas within the James Creek drainage would be higher than in the more topographically favorable Ninemile Gap area. It would be more cost efficient to base mining equipment in Ninemile Gap than in James Creek, as suggested in the initial proposal.

Consol's Current Proposal

Consol plans to use an advancing open pit operation. Coal production begins at 2 million tons for year 1 and increases annually by 2 million tons per year until year 5, with the maximum production of 10 million tons per year. This would produce 280 million tons of coal and require a 30-year mine life. Appendix D gives Consol's proposed mitigation plan.

Consol developed the mining unit from the available coal reserves within the PRLA and its surrounding Federal leases that have been leased to Consol. The mining unit is based on the following criteria, which have been developed and identified by Consol:

1. Marketing would require a 30 year, 10-million-ton-per-year contiguous reserve.
2. A maximum pit depth of approximately 800 feet would be necessary to be economically competitive.
3. Avoidance of the Sulfur Creek Syncline area (map 2-2), where the coal seams of interest dropped approximately 2,000 feet deeper than the same seams in the mining unit, making mining far more difficult and costly.
4. Avoidance of the surface recoverable coal within the four leases held by Consol, C-1546, C-093714, C-093715, and C-093716, because of wildlife concerns.
5. Avoidance of the Ninemile Gap elk migration corridor.

Mining would commence in the headwaters of James Creek northeast of Ninemile Gap (section 12) and would progress southeasterly for approximately 3½ years. Mining would then proceed northwest of the original pit, arriving at the northern PRLA boundary in the 23rd production year. The remaining 7 years of production would be spent mining the ridge from north to south between Highway 13 and James Creek, ending, as necessary, to protect the Ninemile Gap elk migration route. Locations of approximate mining areas by year, support facilities, and stockpile locations are illustrated in map 2-3. Annual disturbance by year is summarized in table 2-2.

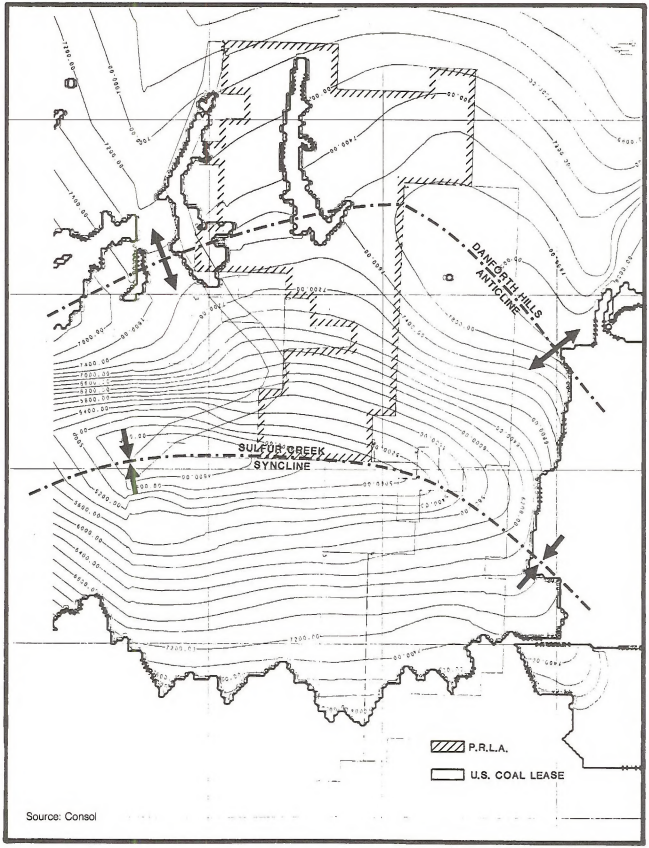
At initial pit development, topsoil, which averages 23 inches in depth, would be removed using 31-cubic-yard scrapers and stockpiled. In areas with greater than 23 inches of topsoil, truck/shovels may be used, and on slopes of greater than 30 percent, bulldozers may be necessary. Consol would stabilize the stockpiled topsoil and then redistribute it as soon as possible as part of an ongoing operation.

The exposed overburden and thick interburden would be loosened by blasting, loaded into 170-ton dump trucks by electric shovels and front-end loaders, and then hauled to either a stockpile or to available spoil sites within the pit. The in-pit spoil would be used to reconstruct benches in the mined coal areas. Average pit size would be 400 surface acres by about 500 feet deep (figure 2-3).

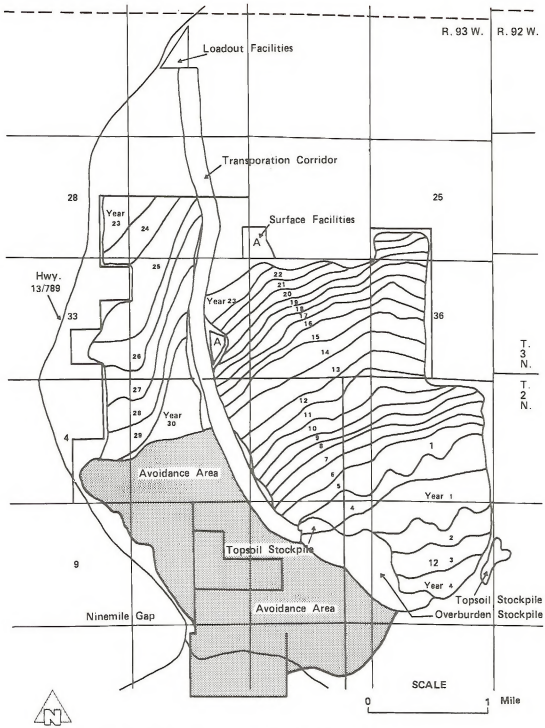
TABLE 2–2
ANNUAL MINING DISTURBANCE*

Year	*Approximate Acres Disturbed*
1	265
2	178
3	105
4	233
5	194
6	142
7	100
8	86
9	106
10	111
11	148
12	143
13	169
14	196
15	121
16	101
17	93
18	94
19	95
20	91
21	76
22	61
23	47
24	176
25	172
26	121
27	117
28	108
29	79
30	119

*Does not include acreage associated with permanent facilities, i.e., shop, bathhouse, etc. (Consol 1984b).



Map 2-2 Structure of the Last Mineable Seam



Map 2-3 Area Disturbance by Year and Proposed Facility Areas

Source: Consol

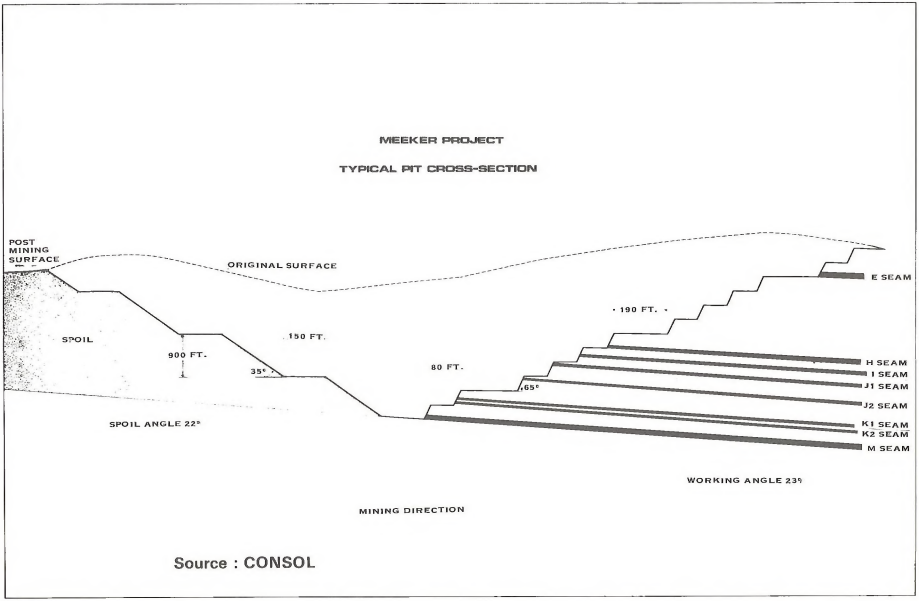


Figure 2-3 Typical Pit Cross Section

Comparison of Consol's Initial and Current Surface Mine Proposals

A comparison of the impacted acreage of Consol's initial surface and current proposals is shown in tables 2-3 and 2-4. The area that has been avoided is shown on map 2-2.

Seventeen coal seams, ranging from 3.5 to 35 feet thick, would be recovered.

Coal would be moved from the active pit to a proposed railroad loadout near the confluence of James Creek and Good Spring Creek. Consol is considering the following options for moving and crushing coal (BLM's analysis used option 1 as a worst-case analysis):

1. Hauling coal by 160-ton bottom dump trucks along James Creek to crushers located at the loadout facility; or
2. Crushing the coal before transporting it by conveyor along James Creek to the loadout facility.

To protect any developments in James Creek, stream modifications would be designed for all facilities to safely pass the 100-year, 24-hour storm. Coal at the loadout site would be stored in either enclosed silos or open bins (pending air quality considerations) before unit train loadout.

TABLE 2-3
IMPACTED HABITAT

	*Acreage of Potentially Impacted Habitat**	
Proposal	*Calving Areas*	*Winter Concentration Areas*
Initial Surface Proposal	5,137	2,913
Consol's Present Proposal	4,750	1,226

*Buffer zones were superimposed around surface impacts as described in the Meeker PRLA Elk Mitigation Feasibility Assessment (CDM 1984b).

TABLE 2-4
IMPACTED VEGETATION

	*Acreage of Potentially Impacted Vegetation Types**					
Proposal	*Mtn. Shrub*	*Sage*	*Aspen*	*Bunch-grass*	*Wet-land*	*Mtn. Grass-land*
Initial Surface Proposal	4,510	864	1,282	63	163	145
Consol's Present Proposal	3,007	361	1,174	19	60	146

*No buffer zone was placed around surface impacts in computation of these acreages (CDM 1985).

Map 2-3 illustrates the areas annually disturbed by mining. Consol would begin reclamation on the areas immediately after backfilling. The final slopes would be regraded to a 2.25:1 slope or flatter to ensure long-term slope stability. The ridges on either side of James Creek and the disturbed areas in its upper reaches would be reclaimed to approximately their original contour.

Detailed commitments to slope lengths, terraces, drainage densities, erosion control, and revegetation in the resultant permit application could necessitate revising the post-mining topography.

Typically, reclamation would begin within 3 to 5 years after mining; however, due to the pit requirement of a 22 degree spoil angle, this could be as long as 7 years, requiring temporary topsoil and overburden stockpiles. The final pit would be backfilled and graded within 3 years of production termination and would conform to the surrounding topography as much as possible. All reclamation must meet Office of Surface Mining and Colorado Mined Land Reclamation Division standards.

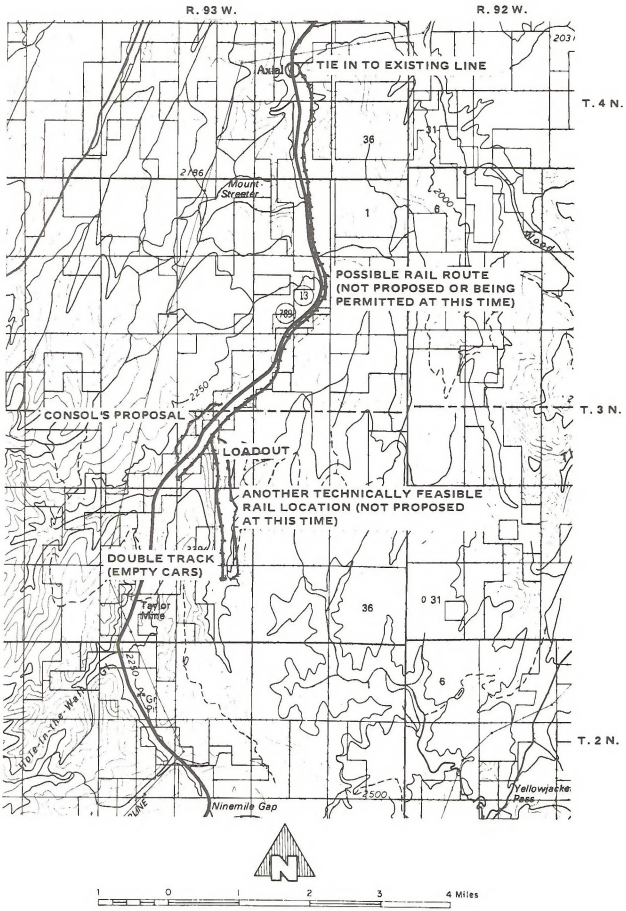
Consol has proposed the mitigation plan that appears in Appendix D. It is an integral part of the analysis in this EIS. It has been presented in its entirety because of the key role it has in Consol's proposal.

Transportation of Coal from the PRLA

Consol anticipates transporting coal by rail. At this time Consol has not identified James Creek as a possible location for the rail spur. However, BLM sees this as technically possible (although not necessarily more feasible or preferred). The new rail line would tie in with the existing line which serves Colowyo Coal Company (map 2-4).

Consol has not proposed this rail line, and it most probably will be another company (possibly the Colorado and Wyoming, or Denver and Rio Grande Railroad companies) that would eventually build and own the track. At the time a proposal is made, an additional environmental analysis will be prepared, if necessary.

Because of the wildlife habitat and wetlands present in the bottom of Good Spring Creek, it is possible that the Army Corps of Engineers, U.S. Fish and Wildlife Service, BLM, and the Interstate Commerce Commission, as well as several state agencies, may have jurisdictional roles. Again, however, no proposal to build the rail line has been received and no permit for construction is under consideration.



Map 2-4 Approximate Locations of Railroad Lines

All significant impacts resulting from the proposed rail line, which are anticipated to occur based on present knowledge, are addressed as part of the overall analysis of development.

PREFERRED ALTERNATIVE

The Preferred Alternative emphasizes coal production and protection of the other natural resources within the PRLA. The lease form and stipulations, as they would appear when sent to Consol in the Request for Final Showing, are presented in Appendix C. BLM's alternative simply adds mitigation in the various resources to Consol's Proposed Action.

Wildlife

Approval for development of the PRLA will require that at the earliest possible date impacts to raptors or raptor nest sites can be identified. Consol will notify and obtain from the USFWS and CDOW approval for site-specific plans to avoid and/or mitigate adverse impacts to raptor species, consistent with the regulatory authority of these agencies and programs.

Soils

Consol has agreed that all areas disturbed by the proposed action would be reclaimed and stabilized as soon as possible following the disturbance. In addition, soil removed from aspen sites would: 1) be placed immediately on regraded backfill where aspen would be established, or 2) be stockpiled separately and redistributed in areas where aspen would be established. These practices will be required if they are needed to meet the aspen reclamation standard discussed under Vegetation. They will be analyzed in an aspen reclamation study.

Consol would determine the available moisture percentage (defined as the difference between one-third and 15 atmosphere moisture percentages) on all major areas of aspen soil prior to their disturbance. Postdisturbance aspen soils would duplicate these available moisture percentages as near as possible (the exact depth and variation from the predisturbance soil values would be determined at the mine plan stage).

If sufficient quantities of topsoil were confirmed by the detailed soil survey during mine planning, the following soil depths would apply.

1. There would be a minimum soil depth of 2.5 feet in aspen areas at all elevations, and north and east facing slopes at elevations of 7,800 feet or greater.
2. Minimal soil would be at least 1.5 feet in depth at other aspects over 7,800 feet.
3. Remaining soil depths would be at least 1.5 feet in shrubland and 1 foot in grassland areas.

Consol would directly replace topsoil on regraded backfill to the soil depth given above, where practical.

In addition to standard soil tests, Consol would conduct the following analyses: organic matter, microbial populations and diversity, and carbon/nitrogen ratios.

Actual reclamation would not be done until aspen stands have been disturbed through mining. However, Consol would be required to conduct studies prior to disturbance, in similar habitat and ecologic conditions, which would indicate success in reclaiming aspen. Reclamation would verify these studies on aspen reclamation techniques (including creation of perched water tables) and creation of artificial seeps. Actual parameters of these studies, i.e., objectives, time frame, location, size, would be deferred until Permit Application Process unless Consol wished to begin it earlier. If techniques could be developed that would show statistical improvements in reclaimed aspen densities or growth and creation of alternate water sources, the techniques would be incorporated into the overall reclamation plan.

Vegetation

The following would be added to Consol's proposed methods of reestablishing vegetation. Postmine vegetation would be composed of 50 percent shrubland, 25 percent aspen, and 25 percent grassland. In conjunction with the aspen site, creation of perched water tables would be studied. A minimum postmine aspen stand standard to be met at bond release would:

1. Have a minimum density of 500 stems per acre.
2. Have survived at least 5 years.
3. Be at least 5 feet tall.
4. Occupy at least 25 percent of the disturbed area.

Water Resources (Surface and Groundwater)

The BLM would require measures to reduce the impact to quality and quantity of water located on and near the PRLA and lease C-093713. Measures would include establishing a modified buffer zone (a buffer strip that would allow some activities provided Consol could demonstrate to BLM that these activities would not significantly affect the water quality and quantity in James Creek or the stability of the channel) along James Creek, designing sediment ponds to withstand a 40-year, 24-hour storm, creating artificial seep areas

(although experimental and not proven, BLM anticipates this could be successfully accomplished), stabilizing stream banks and channels, terracing lands adjacent to waterways to maintain flow and water quality in James Creek, minimizing transportation-related disturbances in James Creek through the use of methods such as a conveyor system where practical, and minimizing impacts in the main James Creek channel resulting from the overburden stockpile. Detailed designs would be performed at the mine plan stage.

Cultural and Paleontological Resources

Additional stipulations will be required to protect cultural and paleontological resources. See the stipulations in Appendix C.

ALTERNATIVES IDENTIFIED BUT ELIMINATED FROM FURTHER DETAILED STUDY

Underground Mining and Summary of Impacts Analyzed in the Environmental Assessment

Underground Mining

The following development scenario was based on information presented to BLM in 1977 by Consol for development of PRLA C-0126998. The data were analyzed and presented in an environmental assessment in 1982. The following brief description of Consol's underground mine plan comes from the environmental assessment of PRLA C-0126998, 1982.

Consol's initial mining concept consisted of the room-and-pillar and longwall extraction method using continuous miners and longwall equipment. Four portals, accessed by mine roads (approximately 20 feet wide), would enter the outcrop along both sides of James Creek. Conveyors would transport the mined coal from the portals to preparation and loading facilities along the floor of the James Creek valley. Surface support facilities, such as office buildings, warehouse, bathhouse, parking lot, supply yard, and storage silos, would also be located on the valley floor (map 2-5).

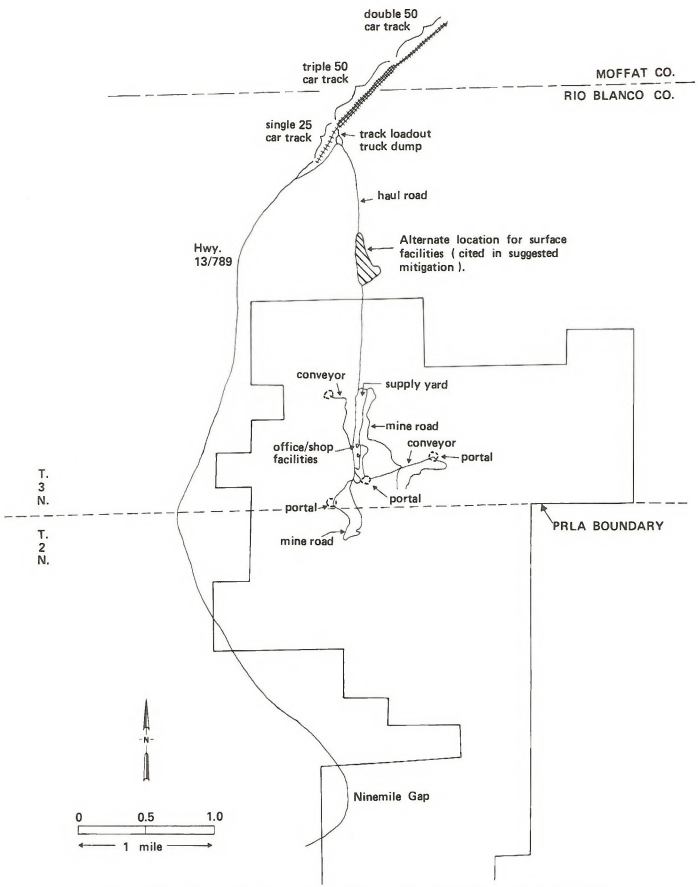
Ventilation would occur through the portal systems, so necessary ventilation shafts would not be required.

General access to the mine headquarters would be by a haul road (about 40 feet wide) leading south from Colorado Highway 13/789 (T. 2 N., R. 93 W., section 22, SE¼ NW¼) up the James Creek Valley approximately 3 miles. Electrical lines to supply power to the mine would be located along this haul road.

Summary of Impacts of Underground Mining

The following summarizes the notable potential and imminent impacts of the underground mining plan. This summary does not include suggested mitigative practices. Complete details on impacts and mitigation are contained in the 1982 Environmental Assessment on this PRLA, which is available for review at the Colorado State, Craig District, and White River Resource Area offices of the BLM.

1. Soil profile destruction and removal of soil material through construction, on about 100 acres.
2. Removal of vegetation from about 100 acres to accommodate mining facilities.
3. Direct loss, through vegetation removal, of about 100 acres of elk critical winter habitat and spring through fall deer habitat.
4. Removal and marketing of 29 million tons of coal from total PRLA reserves.
5. Undetermined potential for adverse hydrologic impacts to the James Creek area resulting from an unknown degree of subsidence and groundwater percolation. In a worst-case situation, local stream flow, springs, and seeps could be interrupted or lost, which could inflict significantly adverse impacts to local agricultural, rangeland, and wildlife habitat use.
6. Alteration (direct or indirect loss) of 30 or fewer acres of riparian and wetland vegetation.
7. Short-term displacement of beaver, where they occur adjacent to mine facilities.
8. Disturbance of deer and elk from a zone surrounding the mine facilities, preventing optimal use of forage, cover, and water resources available on approximately 1,400 acres. Successful mitigative attempts, as outlined, would partially to fully compensate elk and mule deer habitat loss by enhancing adjacent, unaffected ranges, but habitat loss and animal displacement would still occur locally at the mine site. The degree of mitigative success is impossible to predict.
9. Undetermined escalation of deer and elk road kills, poaching, and habitat degradation related to human population influx, and anticipated rises in game damage to agricultural crops.
10. Loss of approximately 100 livestock-animal-unit months annually through mine life and short-term



Map 2-5 Consol's Proposed PRLA Underground Development

inaccessibility to key grazing areas along lower James Creek.

11. Possible destruction of unknown subsurface cultural or paleontological remains.
12. Visual domination of facilities, roads, etc., would visually dominate the landscape of the valley floor.
13. Increase in social impacts as a result of population increases of 3 percent in Meeker and 4 percent in Craig over the 1987 population base line.
14. Increase in local population and in tax revenues from increased business activity. The increase in employment would add to the area's dependence on the energy mineral industry.

Coal Reserves Suitable for Underground Mining

Based on data supplied by Consol in its initial showing, underground reserves were estimated to be approximately 14.9 million tons. Coal seams between 4 and 14 feet thick could be mined to a maximum depth of 1,500 feet, and minimum interburden thickness between coal seams would be 40 feet. Approximately 50 percent of the seams mined by underground methods would be recovered.

Consol provided several different estimates of tonnages to BLM over the years, based on different analyses of the reserves. Subsequently, different figures were used in the EA than in the initial showing, and a third set of figures are used in Consol's current proposal.

Conclusion

The greatest impact of underground mining would be the lower recovery of the coal resource, from about 280 million tons to about 29 million tons. No determination has been made whether or not the remaining reserves would be surface minable.

All environmental impacts which are associated with underground mining are within the same range of impacts that occur from surface mining, discussed in this EIS. Consequently, an underground mining scenario has not been included in the document.

Other Locations for Development (for Underground or Surface Development)

No other tracts were considered as alternatives at this time because of the processing requirements of the PRLA. Development of an adjacent lease, in conjunction with the PRLA, is a very strong possibility and, therefore, Consol included it in the company's proposal.

Other Production Levels

To explore a wider range of alternatives, BLM considered Consol's production at 2 and 5 million tons per year during scoping/preliminary analysis. Because impacts are largely based on disturbance rather than production, no major differences in impacts are expected to occur from lower PRLA development levels. Surface disturbance, based on current reserve information, is not directly related to production levels.

If subsequent information in the Permit Application Package indicates production-level related impacts, they will be addressed at that time. Coal production for northwest Colorado is expected to remain about the same, with or without development of this PRLA.

BLM is processing the PRLA because of regulatory and policy mandates. Consol believes that it may capture a share of future markets; therefore, the company wants the opportunity to obtain the lease should BLM decide to issue one.

MAJOR FEDERAL LAWS MITIGATING COAL-RELATED IMPACTS

This analysis assumes enforcement and compliance with all environmental-protection laws and regulations. No significant impacts were identified where impacts would already be mitigated to an insignificant level through current laws and regulations.

Appendix B summarizes the major laws and agencies controlling the leasing and mining of Federal coal resources.

Mitigative measures would be used to protect elk concentration areas and calving areas that have been disturbed (see Appendix D).

SUMMARY OF THE IMPACTS AND COMPARISON OF ALTERNATIVES

The following narrative compares the impacts for each alternative.

Wildlife

Elk Habitat

No Action/No Development Alternative. There would be no impacts to elk winter concentration areas, elk calving areas, or areas suitable as winter or year-round elk habitat.

Consol's Proposed Action. Selected elk winter concentration areas, elk calving areas, and range suitable as winter or year-round elk habitat would be altered. Impacts would be reduced to an acceptable level. See Consol's Mitigation Plan in Appendix D.

BLM's Preferred Alternative. Same as the Proposed Plan.

Other Wildlife

No Action/No Development Alternative. No change from current conditions.

Consol's Proposed Action. Existing raptor nests would be destroyed.

BLM's Preferred Alternative. Raptors would be protected by mitigation identified by U.S. Fish and Wildlife Service during the mine permitting process.

Establishment of buffer areas consistent with mine planning would reduce impacts on beaver by maintaining existing water quality and quantity in James Creek, as discussed under Surface Water in Chapter 3.

Soils

No Action/No Development Alternative. No change from current conditions.

Consol's Proposed Action. The natural soil system would be altered.

BLM's Preferred Alternative. In addition to those items in the proposed action, this alternative protects the productivity of aspen soils and proposes studies on aspen reclamation. Consol would be required to develop and implement effective reclamation techniques.

Topography

No Action/No Development Alternative. No change from current conditions.

Consol's Proposed Action. Each landform element would be restored in the postmining landscape of the coal lease. Construction of swales, water impoundments and larger drainage features would be undertaken. Benches on north-facing slopes would be constructed.

BLM's Preferred Alternative. Basically the same as the Proposed Alternative; however, terraces and benches would also be located on slopes adjacent to major waterways.

Surface Water

No Action/No Development Alternative. Management practices associated with undeveloped rangeland would continue with no significant impacts to surface water resources.

Consol's Proposed Action. Potentially significant alteration of the quantity and quality of surface water.

Alteration of the hydrologic regime of James Creek would result in earlier peak flows, lower peak flows, increased mean general runoff, and higher base flows after reclamation.

Present channel morphology for portions of James Creek, Elkhorn Creek, Little Creek, and Good Spring Creek would be altered.

Surface water quality would be altered. Spoils aquifer water contributions to surface water systems would increase total dissolved solid values on-site and off-site. Increased total suspended solid values are expected on-site in the James Creek, Good Spring Creek, Elkhorn Creek, and Little Creek watersheds during the mining and reclamation phases. Total suspended solids values should not significantly increase off-site. Some existing uses may be precluded.

BLM's Preferred Alternative. Impacts would be similar to the Proposed Action; however, mitigation would lessen the severity of the impacts to surface water resources. Existing uses of water would be protected.

Groundwater

No Action/No Development Alternative. The flow of springs and seeps in or near the project area would continue. There would be no significant impacts to groundwater resources.

Consol's Proposed Action. The flow of existing springs in or near the proposed mining area would be displaced, reduced, or eliminated.

Total dissolved solid concentrations would increase in the project area's groundwater.

Mining would change present aquifer properties and groundwater flow patterns.

Owners of water rights (other than the mining operator) may require compensation if these water supplies are contaminated, diminished, or interrupted.

Impacts to groundwater have the potential to become significant.

BLM's Preferred Alternative. Same as Proposed Action, but the proposed mitigation would lessen the severity of the impacts to groundwater resources.

Alluvial Valley Floors

No Action/No Development Alternative. Management practices associated with undeveloped rangeland would continue with no significant impacts to proposed alluvial valley floors.

Consol's Proposed Action. Construction and use of a rail spur, increased levels of total dissolved solids, and alteration of the James Creek hydrologic regime might impact proposed alluvial valley floors in Good Spring and James creeks. With required mitigation (OSM and CMLRD), significant impacts would be precluded.

BLM's Preferred Alternative. Inputs would be the same as under the Proposed Action.

Floodplains

No Action/No Development Alternative. Existing impacts would continue.

Consol's Proposed Action. Design of facilities "... will emphasize minimizing impacts to James Creek channel and floodplain. Where impacts are unavoidable temporary stream modifications will be designed to safely pass the 100-year, 24-hour storm" (Consol 1984). Consol would transport coal from the mine area via trucks or conveyor system, either of which may be in the floodplain.

BLM's Preferred Alternative. BLM would minimize impacts to James Creek's channel and floodplain by not allowing a haul road or pit development either adjacent to James Creek within the buffer strip (this would allow some use such as a conveyor system or slurry pipeline), unless Consol can demonstrate to BLM, during the permitting process, that this restriction is unnecessary. Consol must also demonstrate that the design of the overburden stockpile in the headwaters of James Creek will not preclude existing uses of James Creek water. This may include removal of the stockpile area in the headwaters of James Creek to another site within the PRLA, if practical. Specifics on how to mitigate or avoid unstable slopes or soils would be developed during the mine permitting process.

Vegetation

No Action/No Development Alternative. No change from current conditions.

Consol's Proposed Action. Up to 5,200 acres of vegetation would be disturbed; however, the loss of vegetation is considered mitigable and not significant. There would be no reclamation standard for aspen. Techniques are available that should result in successful aspen reclamation, but none have been proven locally.

BLM's Preferred Alternative. Similar to Consol's proposal. The composition of reclaimed vegetation would change slightly with more grassland. Reclamation standards for aspen are included under this alternative.

Cultural Resources

No Action/No Development Alternative. No change from current conditions.

Consol's Proposed Action. There is a potential for loss of undiscovered sites of unknown significance.

BLM's Preferred Alternative. Same as the Proposed Action.

Paleontological Resources

No Action/No Development Alternative. No change from current conditions.

Consol's Proposed Action. There are no known significant impacts, but there is potential for future impacts of unknown magnitude.

BLM's Preferred Alternative. There are no known impacts and the potential for future impacts would be reduced.

Land Use/Grazing

No Action/No Development Alternative. No change from current conditions would occur.

Consol's Proposed Action. There would be short-term loss of forage, but the loss is not significant since it involves changes in only one ranch operation.

BLM's Preferred Alternative. Same as Proposed Action.

Recreation and Visual Resources

No Action/No Development Alternative. No change from current conditions.

Consol's Proposed Action. This proposed action would reduce the natural visual aspects adjacent to James Creek.

BLM's Preferred Alternative. The impacts to visual resource values would be reduced by creating a buffer strip adjacent to James Creek.

Socioeconomics

No Action/No Development Alternative. There would be a population increase of 2,300 persons in the area.

Consol's Proposed Action. Same as No Action.

BLM's Preferred Alternative. Same as No Action.

SUMMARY OF UNSUITABILITY ANALYSIS

Coal management regulations (43 CFR 3461) require that BLM apply unsuitability criteria to lands considered for coal leasing and development. If any of the criteria apply, affected portions of the lease would be declared unsuitable for all or some surface mining methods. If impacts could be avoided or satisfactorily mitigated using lease stipulations, the unsuitability criterion would allow development. Of the 20 criteria that have been applied to the PRLA, five of them would require mitigation for the tract to be found suitable for development. These five criteria include:

1. Two public roads bisect the PRLA, all lands within 100 feet of the right-of-way are unsuitable under Criterion #3.
2. A series of rock alignments will require test excavation prior to disturbance to determine their eligibility to the National Register. This action may be necessary under Criterion #7 (Historic Land and Sites).
3. The PRLA is composed of an aggregation of habitats considered to be important in maintaining present characteristics of the main White River elk herd. Criterion #15 (Fish and Wildlife Habitat) does not preclude mining; however, mitigation must be applied.
4. Under Criterion #16 (Floodplains), mine facilities would not be located within the 100-year floodplain of James Creek, without being designed to safely pass a 100-year, 24-hour event.
5. Criterion #19 (Alluvial Valley Floors) would require mitigation designed to protect the water supply systems to the significant agricultural land in James Creek and Good Spring Creek at the time of the mine plan. Determination of significant AVFs will be performed by OSM at the mine permit stage.

A detailed explanation of the application of unsuitability criteria and a copy of the criteria (43 CFR 3460) are found in Appendix A.

PROPOSED LAND-USE PLANNING DECISIONS

Under BLM's land-use planning decisions, three alternatives would be available: 1) no leasing or development, 2) leasing and development with specific conditions, or 3) leasing and development without special stipulation.

Under BLM's Preferred Alternative, the White River Resource Area Management Framework Plan would be changed to incorporate the following land-use decisions. (No decision has been made yet on the project area.)

Leasing and development would be allowed in the project area. There would be no surface disturbance or occupancy, except for the PRLA and the Federal leases in the "mine area" (based on the application of Criterion #15 and multiple use trade offs). See figure 3-1 in Appendix D for a map of these areas.

This would apply until the habitat removed by mining had been returned to its premining value and any additional disturbed habitat had been compensated for by some form of mitigation.

Development will be allowed for the portion identified as "mine area" with the stipulations in Appendix C under BLM's Preferred Alternative. The following decisions also apply to the PRLA:

- No disturbance will be allowed within 100 feet of the right-of-way of Rio Blanco County Road 30 or Colorado Highway 13/789 without appropriate approval from Rio Blanco County or the state of Colorado. (Unsuitability Criterion #3).
- Appropriate flood control measures (able to safely pass a 100-year, 24-hour event) will be required for development within any floodplains within the PRLA (Unsuitability Criterion #16).
- No decision on alluvial valley floors is being made at this time. It will be made during the mine permitting process by OSM. (Unsuitability Criterion #19).

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

CHAPTER 3—AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This section focuses on the significant environmental impacts that would occur from development of the PRLA and adjacent Federal leases. Impacts from all alternatives have been addressed. Insignificant impacts have only been summarized, and significant impacts have been discussed at length.

The Affected Environment and Environmental Consequences, as they relate to the subject, are discussed under each resource.

Significant, unavoidable adverse impacts; irreversible or irretrievable commitments of resources; or the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity, if expected, are discussed in each section's conclusion. If no discussion is presented, no impacts are expected.

Because the amount of coal development in the area does not depend on leasing of this PRLA, and because Consol has committed to many mitigative measures in its proposal, the leasing and development of this PRLA is not expected to significantly contribute to any cumulative impacts in the project area, except to social and economic conditions.

CLIMATE

Affected Environment

The project area is located in a semi-arid/steppe, continental climate regime characterized by dry air, sunny days, clear nights, little precipitation, high evaporation, and large diurnal temperature changes. The region's complex topography creates considerable variation in site-specific temperature, precipitation, and surface winds. Extremely frigid conditions and blizzards can occur, but severe weather conditions such as tornadoes, floods, and damaging hail are rare.

Temperatures vary mostly with elevation, and to a lesser extent, local microclimate. Temperatures average 40 degrees F annually, with an average daily minimum of 10 degrees F in winter and an average daily maximum of 85 degrees F in summer. Precipitation amounts average 20 inches annually, with monthly totals between 1 to 2 inches. Frost-free periods occur from late June until late August—a period of 40 to 65 days.

Upper-level winds predominate from the southwest, but surface wind patterns vary with local terrain and ground cover. Synoptic (pressure gradient) winds may be forced around hills or channeled through valleys, but if there are no strong gradient flows, diurnal upslope/downslope winds predominate. Detailed climatic data for this region may be found in PEDCo Environmental, Inc., (1981a) and CDM (1984a).*

Environmental Consequences

There would be no significant impacts to climate from the proposed project or any alternative. The microclimate near the ground at the mine would be modified slightly until revegetation occurred. Temperatures and wind speeds would be higher over bare soil. No mitigation has been proposed.

Conclusion

There would be no significant impacts to climate.

AIR QUALITY

Affected Environment

The existing air quality of the project area is typical of undeveloped regions in the Western United States. Ambient pollutant levels are usually near or below the measurable limits. Notable exceptions in this region include high, short-term concentrations of total suspended particulates (related to local winds) and possibly rural ozone and urban carbon monoxide. Locations vulnerable to decreasing air quality from extensive energy-related resource development, such as coal mining, include the immediate operation area and local population centers.

Current air quality regulations consist primarily of Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) increments. Ambient Air Quality Standards limit the total amounts of specific pollutants allowed in the atmosphere. Areas that consistently violate minimum standards are classified as nonattainment areas, and a plan must be imple-

*Camp, Dresser, and McKee, Inc.

mented to reduce ambient levels to within standards. Areas that have ambient levels within the standards, or exceed the standards due to natural sources (i.e., fugitive dust), are classified by the additional amounts of total suspended particulates and sulfur dioxide deterioration that would be allowed (PSD Class I, II, or III).

Gaseous pollutant monitoring is limited in the project area, but levels are estimated to be low and within standards. The total suspended particulate annual geometric mean concentration is estimated at 26 micrograms per cubic meter, and the 24-hour geometric mean concentration is estimated at 80 micrograms per cubic meter. Most of northwest Colorado has been designated a PSD Class II attainment area. Craig and Rangely have measured particulate levels exceeding the ambient standards. Because the cause is primarily natural dust, these towns have been designated as unclassified (USDI, BLM 1983).

Environmental Consequences

Impacts

Development Alternatives. Under contract to the BLM, PEDCo Environmental, Inc., developed a screening tool to evaluate potential total suspended particulate (TSP) air quality impacts from a surface coal mine (PEDCo 1981b). The technique is biased toward overestimating impacts (worst case mine configuration, utilizing maximum TSP emissions rather than annual averages, conservative meteorologic conditions, etc.).

This evaluation assumes no interaction of other major ground level TSP sources within 2 miles and no elevated TSP sources within 6 miles of the mine (e.g., no other adjacent mines nor any major on-site processing assumed).

When the estimated off-site TSP concentration is added to the existing concentration (nearly 26 micrograms per cubic meter in the Craig Air Basin), the James Creek Mine will remain within the Federal and Colorado annual primary ambient air quality standard of 75 micrograms per cubic meter ($\mu g/m^3$) and slightly exceed the secondary ambient air quality standard of 60 $\mu g/m^3$.

Estimated Air Quality Impacts:

Estimated off-site TSP contribution ($\mu g/m^3$) - 35
Existing off-site TSP concentration ($\mu g/m^3$) - 26
Estimated ambient TSP concentration ($\mu g/m^3$) - 61
Estimated annual TSP emissions (T/yr) - 3,245

These results must be considered preliminary because of the assumptions applied in the screening analysis. Further, less upward biased modeling may indicate lower potential impacts. No mitigation has been proposed.

Conclusion

The proposed action is predicted to slightly exceed the secondary annual total suspended particulate ambient air quality standard.

Both the U.S. Environmental Protection Agency and Colorado's Department of Health Air Quality Control Division would examine potential impacts from the proposed mine when applications were made for the necessary construction/operation permits. Standard lease stipulations would include strict adherence to all applicable state and Federal statutes, laws, and regulations. Long-term postmining impacts on local air quality would be negligible.

SOILS

Affected Environment

Dominant soils within this area include Owen Creek, Jerry, Burnette, Silas Variant, Rhone, Northwater, Lamphier, and Mergel. They are typical of mountainous areas in northwest Colorado (CDM 1984a). There are no prime farmlands within the boundaries of the PRLA (SCS 1982). Detailed descriptions of these soils and the soil mapping units are available in the Rio Blanco County Soil Survey (USDA, SCS 1982) and the Environmental Report, Meeker PRLA, and adjacent Federal Leases (CDM 1984a) contain additional information.

These dominant soils have a wide range of chemical and physical properties, as shown in table 3-1 (pages 34-35). The majority of the soils within the PRLA and adjacent lease areas are found on mountain ridges, side-slopes, and valley sides. Soil depths range from less than 20 inches to greater than 60 inches. Textures of the surface horizons include loam, clay loam, and silty clay loam, while textures of the subsurface horizons vary from fine sandy loam to clay. These horizons contain from less than 10 percent to greater than 65 percent, by volume, of coarse fragments (CDM 1984a and USDA, SCS 1982). These soils developed under an estimated average annual precipitation of 8 to 25 inches and a variety of parent materials, including residuum of sandstone, marine shale, calcareous shales, or in alluvial/colluvial materials.

A measure of soil productivity is the average annual productivity expressed in pounds per acre of air dry vegetation per year. This value varies from approximately 100 to 2,500 lbs for the soils in this area (USDA, SCS 1982).

Factors that influence production are availability of plant nutrients, effective moisture, soil reaction, salt content, seasonal high water table, past and present erosion, soil texture, soil depth, and position on the landform. The most limiting factors for the soils are low moisture at lower elevations, shallow soil depths along ridges, and abbreviated frost-free periods at higher elevations. The existing data on productivity for these soils includes generalized groupings of soil reaction, electrical conductivity, sodium absorption ratio, and organic matter content. Another concern is the low levels of phosphorous and nitrogen (EMRIA Report No. 23 1976).

Soil stability depends on environmental and management variables and the rate of natural or accelerated erosion. The hazard of water erosion within the area varies from slight (on gently sloping areas) to very high (on steeper slopes, table 3-1). Other factors that influence soil stability are kind, intensity, and area of surface-disturbing activities. The surface hazard from water erosion in most of this area ranges from moderate to very high. The underlying geological structure also influences the low stability of slopes, as indicated by the large number of natural landslides.

Environmental Consequences

Impacts

No Development Alternative. Existing natural systems would remain. Projects to correct existing water quality and or soil stability problems would be small scale. Under this alternative, present rates of erosion would continue.

Development Alternatives. Significant impacts might include increased erosion and the loss of soil stability and productivity, particularly in stockpile areas. These would be caused by vegetation and soil removal and the handling, stockpiling, and redistribution of the soil material. The major concern would be reduction of existing productivity of soils which currently support aspen. These soils have higher organic matter contents, water-holding capacity, and pH than adjacent soils (Baker 1925, Morgan 1969, Sheppard 1983, and Tew 1968). These activities would destroy or alter almost all soil properties. Possible impacts on the existing soil system are presented in table 3-2. Impacts would be gradually reversed, after the vegetation and an environmental balance have been established.

Under the Preferred Alternative, impacts would be reduced through the special handling of aspen soils, or other techniques identified by BLM or through incorporation of the aspen reclamation study results before development.

TABLE 3-2
THE POSSIBLE EFFECTS OF MINING ACTIVITIES ON SELECTED SOIL PROPERTIES

*Natural Soil Properties**	*Possible Effects*
Soil structure	Destroyed
Permeability rate	Reduced
Infiltration rate	Reduced
Soil horizons	Destroyed
Number & diversity of soil organisms	Decreased
Nutrient energy cycles	Destroyed
Stability	Decreased
Erosion potential	Increased
Depth	Altered
Texture	Altered
Waterholding capacity	Altered
Soil color	Altered
Native vegetative cover	Removed

*All these properties will exist after mining, but present natural conditions will no longer exist.

More detailed information about these impacts on the soil resource are available at the Craig District Office (Fisher 1983, Hargis 1984, BLM 1980, BLM 1983, and USDI 1976).

Mining would alter the soil profile. This altered condition would exist until the new soil achieved a balance with the environment. The reconstructed soils would be more uniform and less diversified than the existing soils.

Any soil loss and destruction of the natural soil profile would be irreversible. Regulations requiring the same, or improved, productivity that existed before mining would mitigate impacts to soils, except for the destruction of the soil profile.

Conclusion

Short-term impacts to soils would be insignificant if mitigation in Office of Surface Mining (OSM) and Colorado Mine Land Reclamation Division (CMLRD) regulations were strictly enforced. Potential long-term impacts are unknown but should be minimal because of the reclamation program.

Reclamation

Calculations based on preliminary data of topsoil depths and volumes indicate that sufficient material is available to reclaim disturbed areas to a depth of approximately 2 feet within the PRLA and 1.6 to 2.8 feet within the adjacent Federal lease areas (CDM 1984a).

Soils under established aspen stands are different than soils in the adjacent areas (higher moisture-holding capacity, higher productivity and organic matter content, darker color, and more depth). Aspen

TABLE 3-1
CHARACTERISTICS OF SELECTED SOILS WITHIN THE AREA[1/4/]

Soil Map Unit	Map Symbol	Position on the Landscape	Approx. Depth to Bedrock	Surface/Subsurface Textures[2/]	Percentage by Volume Rock Fragments	pH Range
Jerry-Thornburgh-Rhone complex, 8-65% slopes	45	Mountainsides, ridges, and side slopes				
Jerry			5.0	L/Chan.CL	0-35	6.6-8.4
Thornburgh			5.0	Chan.L/Chan.L	0-65	6.6-7.8
Rhone			4.0	L/V Chan L.	0-65	6.6-7.8
Mergel-Redthayne-Dollard complex, 8-65% slopes	51	Mountainsides, hill toe slopes, and ridges				
Mergel			5.0	Chan. CL/V Chan L	15-60	7.4-8.4
Redthayne			5.0	Chan L/C Chan L	15-60	6.6-9.0
Dollard			2.0	SiCL/SiCL	0-5	7.4-9.0
Owen Creek-Jerry Burnette* loams, 5-35% slopes	57	Hillcrests, ridges, and mountainsides				
Owen Creek			2.0	L/CL	0-10	6.6-8.4
Jerry			5.0	L/Chan.CL	0-35	6.6-8.4
Burnette*			5.0	L/C	0-15	6.1-8.4
Rhone-Northwater-Lamphier loams, 3-50% slopes	77	Mountainsides and valley slopes				
Rhone			4.0	L/V Chan.L	0-60	6.6-7.8
Northwater			4.0	L/L,V.Chan SCL, V Chan L	10-65	6.6-7.8
Lamphier			5.0	L/ L/L	15	6.6-7.8
Shawa loam, slopes	80	Alluvial valley floors, lower terraces, and along concave drain ways	5.0	L/CL/CL,fSL,CL,grL	0.10	6.6-7.8
Silas loam, 0-8% slopes	82	Bottom of narrow mtn. valleys	5.0	L/L, SCL	5-15	6.6-7.8
Silas variant loam	84	Alluvial valley floors, fans, swales and terraces	5.0	L/L, S.CL, CL	0-10	7.4-9.4
Torriorthents-Rock Out-Crop complex, 15-90% slopes	91	Extremely rough and eroded areas on mountains, hills ridges and canyonlands	var.	Chan L./Chan L,	var	var
Torriorthents						
Rock Outcrop			0.0			
Waybe-Vandemere Rock Outcrop complex, 0--30%	98	Side slopes, narrow ridgetops				
Waybe			1.5	Flaggy Cl/C; Chan	15-25	7.4-8.4
Vandamore Variant			3.0	SiCl, Chan L/V Chan L,	10-65	7.4-8.4
Rock Outcrop			0.0			

1/ The information in this Table was taken from (CDM 1984a) and (SCS 1982a).

2/ L=Loamy, CHAN=Channery, V=Very, S.CL=Silty Clay Loam, SCL=Sandy Clay Loam, CL=Clay Loam, C=Clay, gr=gravelley.

3/ Hazard to Water Erosion SL=Slight, M-Moderate, H=High, V.H. Very High

Weighted Topsoil Stripping Depth (ft)	Total Acreage	Topsoil Volumes (acre/ft)	Range of Permeability Surface/Subsurface (in/hr)	Hazard [3/] Water Erosion	Range Site Name[5/]	Percentage Organic Matter (%)
2.9	262	759.8				
			0.6-2	M to V.H.	Brush Loam (2,500)	3-5
			0.6-2.0/2.-6.0	SL to V.H.		2-4
			0.6-2.0	MOD to V.H.		3-6
0	46	0				
			0.6-2.0	H to V.H.	Loamy Slopes (1,000)	2-4
			0.6-2.0	H. to V.H.	Loamy Slopes	1-3
			0.06-0.2	MOD to V.H.	Clayey Foothills	1-2
2.2	3509	7719.8				
			0.06-2.0/.06-.2	MOD to H	Brushy Loam (2,000)	2-3
			0.6-2.0	MOD to V.H.		3-5
			0.6-2.0/.06-0.2	MOD to H		3-6
2.4	499	1197.6				
			0.6-2.0	SL to V.H.	Brush Loam (2,250)	3-6
			0.6-2.0	SL to V.H.	Aspen Woodland Site	3-6
			0.6-2.0	M to H	Aspen Woodland Site	2-4
5.0	23	115				
			0.6-2.0	SL to M	Deep Loam (1,200)	2-4
5.0	128	640	0.6-2.0	SL to M	Mountain Swale	1-3
5.0	130	65	0.6-2.0/.2-6	SL	Mountain Swale (2,500)	2-6
0	161	0				
			----	VH	Stony Foothills (100)	100

0	557	0				
			0.2-0.6.06-0.2	M. to H.	Dry Exposure (350)	---
			0.6-2/2.0-6.0	M		1

[4/] All Soil Map Units, except for Units 91 and 98, have Electrical Conductivities (EC's) of less than 2 mmho/cm and Sodium Absorption Ratios (SAR's) of less than 8. Unit 91's EC and SAR are considered to be variable, while Unit 98 has a EC of less than 4 and a SAR of less than 8.

[5/] Numbers in parenthesis are production in lbs/acre.

exist on the more productive soils with higher moisture content and greater depth, which are the only two factors that can be replaced economically during reclamation.

Because predisturbed soils under aspen sites are greater than 40 inches, the 2.5 foot replacement requirement, rather than the 2.0-foot one, would make a difference of 20 percent in soil depth and moisture.

In the past, reclamation practices have not been successful in producing healthy aspen stands on reclaimed areas because the water-holding capacity of the natural soil system was not reproduced, which is the key factor in successfully reproducing aspen. This added 6 inches of soil, therefore, is an important element in the water-holding capacity of the soil.

Anticipated problems associated with infiltration, compaction, and erosion must be considered if these materials are to be used as topsoil. Other problems include the impact on water quality and water quantity, landsliding (or slope stability), wildlife habitat, and postmining use and condition. For a complete discussion of possible reclamation practices see the mitigation section at the end of Chapter 3 and Appendix D. The reclamation proposal made by Consol incorporates combinations of techniques that are not currently practiced in northwest Colorado. BLM specialists believe that these techniques should prove to be successful. The biggest obstacle that is expected to be encountered is reclaiming aspen on a widespread basis; however, careful planning and implementation, with an emphasis on duplicating the ecological conditions that existed prior to mining, should result in a successful reclamation effort.

ALLUVIAL VALLEY FLOORS (AVF)

Preliminary AVF classifications are recommended for the specially managed subirrigated lands located on unconsolidated stream-laid deposits in sections 15 and 22, T. 3 N., R. 93 W., and section 9, T. 2 N., R. 93 W., all of which are located outside the study area. The significance of the areas that are being recommended as AVFs will be determined at the mine plan stage.

Affected Environment

BLM and CMLRD regulations require identification of alluvial valley floors (AVFs) that might be affected by mining, based on guidelines published by OSM and CMLRD (43 CFR 3461.1 (1984); OSM (1983), CMLRD (1980)). The intent of these regulations is to protect AVFs located within and near the mined area.

CMLRD regulations state that an AVF exists if:

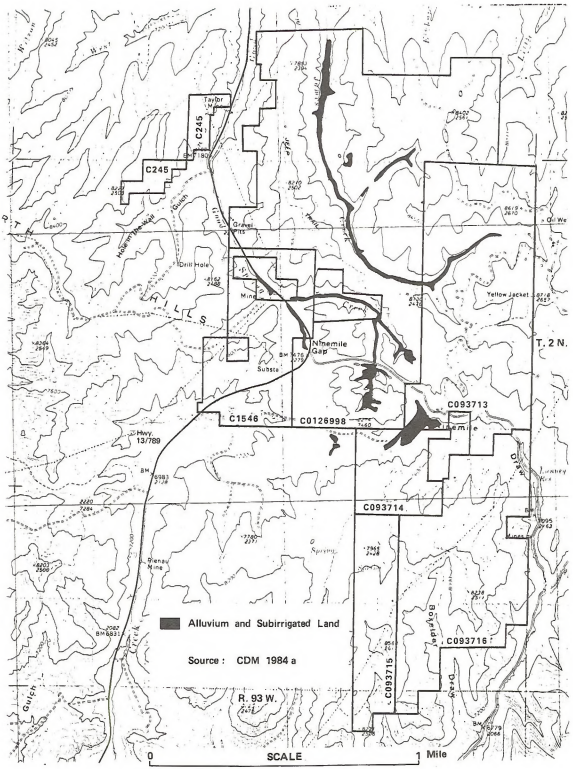
1. Unconsolidated stream-laid deposits holding streams are present; and
2. There is sufficient water to support agricultural activities, as evidenced by:
   - The existence of flood irrigation in the area or its historical use;
   - The capability of the area to be flood irrigated, based on stream-flow water yield, soils, water quality, topography, and regional practices; or
   - Subirrigation of the area, derived from the groundwater system of the valley floor (CMLRD 1980, 2.06.8).

OSM guidelines define an AVF as follows:

1. A topographic valley with a continuous perennial, intermittent, or ephemeral stream channel running through it. This valley must contain:
   - Surface landforms that are either floodplains or terraces, if these landforms are underlain by unconsolidated deposits; and
   - Side-slope areas that can reasonably be shown to be underlain by alluvium and that are adjacent to floodplain or terrace landform areas.
2. Water is available by surface-water irrigation or subirrigation and is being or has been successfully used to enhance production of agriculturally useful vegetation, or surface water is available in sufficient quantities to support agricultural activities (OSM 1983, II-7 to II-11).

Once an alluvial valley floor has been identified using the above criteria, a determination must be made whether the AVF is "significant" or "insignificant." If it is undeveloped rangeland that is relatively unimportant to farming operations, or if the amount of disturbed acreage is small and provides or may provide negligible support for production of one or more farming operations, the AVF is "insignificant" (OSM, I-8, 1983; CMLRD, 2.06.8, 1980). Past and present land uses and management practices within and adjacent to the affected alluvial valley provide information regarding the significance of an AVF. Restrictions that would be placed on significant AVFs are described in Appendix A.

The following are preliminary recommendations regarding AVF classifications in the project area. Final AVF classifications will be performed at the mine plan stage.



Map 3 - 1 Potentially Significant Alluvial Valley Floors.

James Creek

Subirrigated unconsolidated stream-laid deposits comprise a strip varying from 60 to 300 feet wide in the valley bottom (map 3-1) (CDM 1984a).

Groundwater monitoring data, soil moisture, vegetation rooting depth, soil mottling, and the water requirements of the resident vegetation indicate that the James Creek valley floor is subirrigated. The subirrigated vegetation includes giant wildrye, brome species, bluegrass species, sedge species, and rush species, which are considered to be agriculturally useful (CDM 1984a, BLM 1985). Also present is scrub willow. The probable extent of subirrigation is presented in map 3-1 (CDM 1984a).

There is no evidence of historical or recent flood irrigation within and immediately adjacent to the PRLA and lease C-093713 (CDM 1984a). Adjudicated water rights exist on the AQ No. 1 Ditch and AQ No. 1 Ditch headgate #1 in the SE¼NW¼ section 11, T. 3 N., R. 93 W., at the mouth of the James Creek (Colorado Division of Water Resources 1984, 1985).

Surface water also appears to be available in sufficient quantities to support agricultural activities (CDM 1984a).

Monitoring data obtained in 1983 and 1984 indicate that the average total dissolved solids (TDS) concentration is approximately 750 mg/l (CDM 1984a). This value suggests that the water quality of James Creek is not limiting for certain agricultural activities.

The soil within the James Creek valley bottom is predominately Silas Variant and is rated as suitable for irrigation (CDM 1984a).

The James Creek alluvial valley within the PRLA is used by landowners and lessees primarily for livestock grazing. Outside the PRLA, near the mouth of James Creek, an approximate 10-acre subirrigated pasture and hay field exists. Brush removal and weed control occurs in and around the 10 acres (CDM 1984a).

Good Spring Creek

Preliminary AVF classifications are recommended for the 10-acre smooth brome pasture in section 9, T. 2 N., R. 93 W., and the flood irrigated hay/pasture in section 15, T. 3 N., R. 93 W., both of which are outside the project area. Also, the state of Colorado has determined that significant AVFs are present in sections 11 and 14 of T. 3 N., R. 93 W. The subirrigated and improved land in section 14, T. 2 N., R. 93 W., is on colluvial slopewash materials, not alluvium (CDM 1984a), and therefore does not meet OSM's and CMLRD's requirements.

The extent of unconsolidated stream-laid deposits and subirrigated land is delineated on map 3-1 (CDM 1984a).

Vegetative species composition, shallow water tables, and soil mottling indicate subirrigation in the valley bottom of Good Spring Creek within and outside of the PRLA and lease C-093713. The probable extent of subirrigation is presented in map 3-1 (CDM 1984a).

There is no evidence of historical or recent flood irrigation along Good Spring Creek within the PRLA (CDM 1984a). Water rights have been adjudicated for several ditches near the PRLA. Specifically these irrigation ditches are:

Freund Ditch #2 SE¼SW¼ section 33, T. 3 N., R. 93 W.

Freund Ditch #3 NW¼SE¼ section 33, T. 3 N., R. 93 W.

Freund Ditch #4 NW¼SE¼, section 33, T. 3 N., R. 93 W.

AQ Ditch SE¼SE¼ section 21, T. 3 N., R. 93 W.

AQ No. 1 Ditch HGT 2 SW¼SE¼ section 15, T. 3 N., R. 93 W.

AQ No. 1 Ditch HGT 3 SE¼SE¼ section 15, T. 3 N., R. 93 W.

AQ No. 2 Suppl. HGT NE¼SW¼ section 14, T. 3 N., R. 93 W.

AQ No. 2 Ditch NE¼SW¼ section 14, T. 3 N., R. 93 W.

(Colorado Division of Water Resources 1984, 1985).

Surface water is present in sufficient quantities to support agricultural activities (CDM 1984a).

Monitoring data obtained in 1983 and 1984 indicate TDS values ranging approximately from 382 mg/l to 908 mg/l (CDM 1984a, Hem 1970). These values suggest that the water quality of Good Spring Creek is not limiting to certain agricultural activities.

The soils within the Good Spring Creek valley bottom include both Silas Variant and Silas Loam. The Silas Variant occurs in lower Good Spring Creek (approximately downstream from the SE¼ section 4, T. 2 N., R. 93 W.), and is rated as suitable for irrigation. The Silas Loam occurs in the upper Good Spring Creek valley bottoms and is generally unsuitable for irrigation (CDM 1984a, SCS 1982).

The portions of the Good Spring Creek watershed within the PRLA are used by the landowners and lessees primarily for livestock grazing. Introduced, improved grasses are located in the northern half of section 14, T. 2 N., R. 93 W. A 10-acre (approximate) smooth brome pasture is located where Good Spring

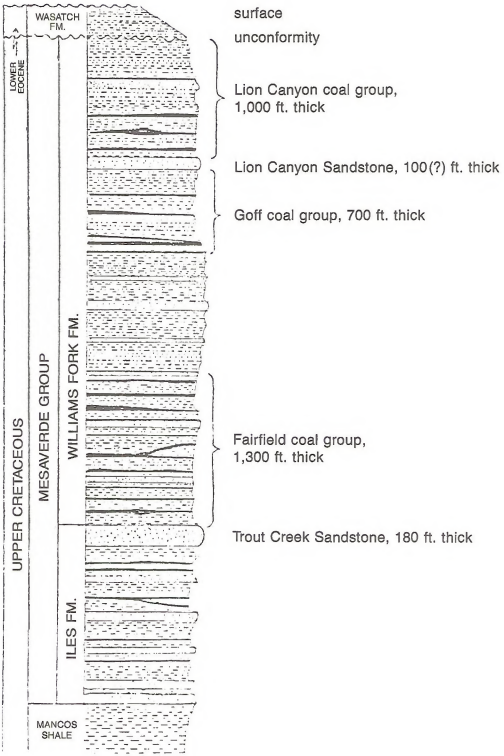


Figure 3–1 Partial Stratigraphic Section Danforth Hills Coal Field Generalized
(after Hancock & Eby, 1930)

Creek crosses the eastern boundary of section 9, T. 2 N., R. 93 W. (CDM 1984a). Most of the valley floor of Good Spring Creek from the James Creek confluence to the Elkhorn Creek confluence is used for hay production (Walsh 1984).

Ninemile Draw

The combination of unconsolidated stream-laid deposits and subirrigation is mainly confined to that portion of Ninemile Draw located in section 13 and section 24 of T. 2 N., R. 93 W. (map 3-1) (CDM 1984a).

Silas Loam is the predominate soil present in the Ninemile Draw Valley in lease C-093713, and this soil is considered generally unsuitable for irrigation (CDM 1984a, SCS 1982).

There are no flood irrigation activities (CDM 1984a) or adjudicated water rights for ditch diversion within lease C-093713 (Colorado Division of Water Resources 1984, 1985).

Livestock grazing is the dominant use of the portions of the Ninemile Draw watershed encompassed by the PRLA and Federal Lease C-093713.

Environmental Consequences

OSM and CMLRD regulations prohibit, under most circumstances, mining operations if the proposed activities interrupt, discontinue, or preclude farming, unless the premining land use has been undeveloped range that is not significant to farming or unless the area is small and provides, or may provide, negligible support farming operations. Land management practices (based on regional practices) provide information on the relative importance of an alluvial valley to a farming operation.

The BLM does not have access to farm and ranch financial data in the area and therefore cannot determine the agricultural significance of these areas. Final determination of AVF status will be made at the mine plan stage by OSM.

Preliminary AVF recommendations based on hydrologic, geologic and management factors are as follows.

James Creek

The 10-acre (approximate) pasture in section 22, T. 3 N., R. 93 W., at the mouth of James Creek is recommended for consideration as an AVF for the following reasons:

1. The area fulfills the geologic criteria of an AVF.
2. The area is subirrigated.
3. The presence of the AQ No. 1 ditch indicates surface irrigation, and this is a regionally practiced form of land management.
4. The resident vegetation is agriculturally useful and highly productive.
5. Brush removal and weed control practices indicate that the area is agriculturally important to ranch operations.

Although this area is outside of the PRLA (approximately 1¼ miles downstream), alteration of the James Creek hydrologic regime and elevated levels of total dissolved solids during and after mining may impact this area.

The remainder of the James Creek Valley does not appear to fulfill OSM and CMLRD criteria and is not recommended for AVF designation.

Good Spring Creek

The state of Colorado has determined that significant AVFs are present in sections 11 and 14, T. 3 N., R. 93 W. (CMLRD 1984). In addition, the valley floors in sections 15 and 22, T. 3 N., R. 93 W., are recommended for consideration as AVFs for the following reasons:

1. The valley floors fulfill the geologic criteria of an AVF.
2. The areas are subirrigated.
3. The presence of the AQD No. 1 Ditch headgates #2 and #3 and James Pipeline indicate surface irrigation, and this is a regionally practiced form of land management.
4. The resident vegetation is agriculturally useful and highly productive.
5. Hay production practices indicate that the areas are agriculturally important to ranch operatons.

These areas are all located outside of the PRLA. The valley floors downstream from the confluence of James and Good Spring creeks, however, may be impacted from the alteration of the James Creek hydrologic regime and increased levels of total dissolved solids. In addition, the construction and use of a rail spur may adversely affect the productivity of the Good Spring Creek valley floor.

The 10-acre smooth brome pasture in section 9, T. 3 N., R. 93 W., may meet OSM and CMLRD criteria for AVF designation. However, no recommendations are presented in this document, as these areas probably would not be significantly influenced by the proposed coal operation.

The subirrigated and improved land in the PRLA in section 14, T. 2 N., R. 93 W., is on colluvial slopewash materials, not alluvium (CDM 1984a), and does not

meet the OSM and CMLRD requirements. The remainder of the Good Spring Creek valleys in the PRLA are also not located on alluvium.

Ninemile Draw

The portions of the Ninemile Draw valley within lease C-093713 do not meet OSM and CMLRD AVF criteria. In addition, the Ninemile Draw valley floor would not be significantly influenced by the proposed coal operation.

Conclusion

Preliminary AVF classifications are recommended for the Good Spring Creek valley floors in sections 15 and 22, T. 3 N., R. 93 W. In addition, a preliminary AVF classification is recommended for the James Creek valley floor in the NW¼ of section 22, T. 3 N., R. 93 W. These lands, in addition to the state designated AVFs in sections 11 and 14, T. 3 N., R. 93 W., may be impacted by the proposed coal operation.

The significance of these lands to agricultural activities will be determined at the mine plan stage.

SURFACE WATER

Alteration of the hydrologic regime of James Creek would result in earlier and lower peak flows, increased runoff, and higher base flows after reclamation.

Present channel morphology for portions of James Creek, Elkhorn Creek, Little Creek, and Good Spring Creek would be altered.

Surface water quality would be altered. Spoils aquifer water contributions to surface water systems would increase total dissolved solid values on-site and off-site. Increased total suspended solid values are expected on-site in the James Creek, Good Spring Creek, Elkhorn Creek, and Little Creek watersheds during the mining and reclamation phases. Total suspended solid values should not significantly increase off-site.

Affected Environment

The PRLA and the adjacent Federal lease C-093713 include portions of the watersheds of James Creek, Good Spring Creek, Curtis Creek, Ninemile Draw, Elkhorn Creek, and Little Creek.

James Creek

James Creek is the principal stream course draining the PRLA. The total drainage basin area is 7.13 square miles, 81 percent of which is included in the PRLA and lease C-093713 (CDM 1984a). The total drainage area within the PRLA is 3.84 square miles, or 48 percent of the total PRLA area (CDM 1984a).

James Creek flows in a north-northwest direction to its confluence with Good Spring Creek. The watershed is characterized by a broad, undulatory upland area, steep valley side slopes, and a narrow, relatively flat-floored valley bottom.

Excessive flows resulting from the above average accumulation of snowpack, unusually rapid spring snowmelt and intense thunderstorms in 1984, deeply incised portions of the James Creek channel.

During 1983 field inspections, the channel segments were relatively stable, with widths averaging 10 to 15 feet and depths from 2 to 5 feet. Channel conditions were heavily influenced by the abundance of beaver dams and the resultant accumulation of sediment, ponds, and reduction of peak flows (CDM 1984a). The excessive flooding in 1984 breached some beaver dams, and altered the existing sediment aggregation/degradation patterns.

Water quality monitoring was performed at 15 stations at James Creek during June and November 1983 and at one station during May and October 1984. Like the watersheds in this area, the water is a calcium-bicarbonate type during the spring runoff period and a magnesium-sulfate type during fall's low-flow period (CDM 1984a).

Conductivity values in 1983 ranged from 450 to 1,905 micromhos/cm (μmhos), which indicate total dissolved solid concentrations between 250 to 1,430 mg/l (Hem 1970). The total dissolved solid concentrations measured at the northern boundary of the PRLA in 1984 averaged 360 mg/l (CDM 1984a).

Estimated flows at the northern boundary of the PRLA in 1983 ranged from 0.13 (November) to 6.0 (July) cfs. Measured flows in 1984 ranged from 1.5 (October) to 12.2 (May) cfs (CDM 1984a).

The Colorado Division of Water Resources has established stream classifications and water quality standards for certain waters, including James Creek. The water quality-use classifications for James Creek are: Recreation, Class II; Cold Water Aquatic Life, Class II; and Agriculture.

James Creek water in the PRLA and federal lease C-093713 is primarily used for stock and wildlife watering. An adjudicated water right exists for the AQ No. 1 Ditch located in the SE¼NW¼ of section 22, T. 3 N., R. 93 W., approximately 1 ½ miles north (downstream) from the PRLA. The water is decreed for irrigation purposes (CDWR 1985, CDWR 1984). Additional water rights information is presented in table 3-3 and map 3-2.

TABLE 3-3
JAMES CREEK WATERSHED—ADJUDICATED WATER RIGHTS WITHIN AND NEAR PRLA AND FEDERAL LEASE C-093713

Name	*Location*	*Use*	*Amount (cfs)*
Helen Jensen Spr. 2	SW¼SW¼ sec. 6, T. 2 N., R. 92 W. (near study area)	irrigation, stock, domestic	0.02
Jensen No. 4 Well	SW¼SE¼ sec. 1, T. 2 N., R. 93 W. (lease 093713)	livestock, combination	0.013
AQ No. 1 Ditch	SE¼NW¼ sec. 22, T. 3 N., R. 93 W. (near study area)	irrigation	5.30
AQ No. 1 Ditch HGT No. 1	SE¼NW¼ sec. 22, T. 3 N., R. 93 W. (near study area)	irrigation	1.80
H Kourlis Ranch #7 Spr.	SW¼NW¼ sec. 26, T. 3 N., R. 93 W. (near study area)	livestock	0.01
H Kourlis Ranch #51 Spr.	NW¼NW¼ sec. 26, T. 3 N., R. 93 W. (near study area)	livestock	0.033
H Kourlis Ranch #14 Spr.	SE¼SW¼ sec. 26, T. 3 N., R. 93 W. (near study area)	livestock	0.03
H Kourlis Ranch #10 Spr.	NW¼NE¼ sec. 34, T. 3 N., R. 93 W. (in PRLA)	livestock, irrigation	0.70
H Kourlis Ranch #11 Spr.	NE¼SE¼ sec. 34, T. 3 N., R. 93 W. (in PRLA)	livestock	0.04
H Kourlis Ranch #15 Spr.	NE¼SE¼ sec. 35, T. 3 N., R. 93 W. (in PRLA)	livestock	0.03
H Kourlis Ranch #16 Spr.	SW¼SE¼ sec. 35, T. 3 N., R. 93 W. (in PRLA)	livestock	0.10

Source: Colorado Division of Water Resources, 1984 and 1985

Good Spring Creek

The Good Spring Creek watershed area is approximately 35 square miles, with about 8.3 percent of watershed within the PRLA. Approximately 2.73 square miles are within the PRLA, or 34 percent of the total PRLA area is occupied by the Good Spring Creek watershed (CDM 1984a). The Good Spring Creek watershed drains the western and southern portions of the PRLA and is tributary to Milk Creek, a tributary of the Yampa River.

The watershed is geomorphically characterized by a gently, undulatory upland area, steep side slopes downstream from the headwaters, and a flat-floored valley. The headwaters are broad and open, with wide, flat, marshy channels, and frequent natural ponds.

The spring flooding of 1984 had less of an impact on Good Spring Creek than on James Creek. Some sedimentation did occur in areas naturally conducive to aggregation, but Good Spring Creek is geomorphically more stable than James Creek. Good Spring Creek's confluence with Milk Creek is approximately 10 miles downstream from the northern PRLA boundary.

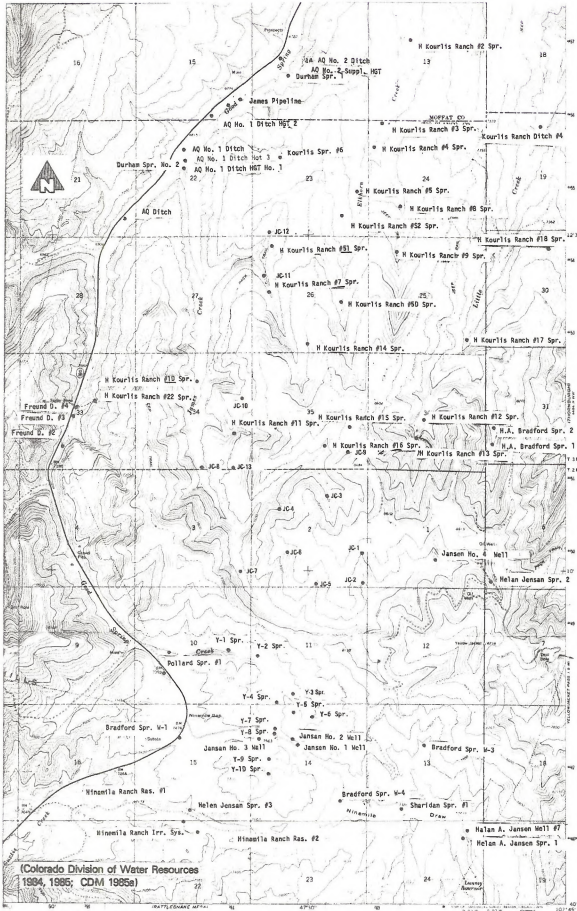
Water quality information available for Good Spring Creek includes data from a USGS station at Axial (discontinued in 1977 and approximately 5 miles downstream from the PRLA boundary) and data from field investigations conducted in 1983 and 1984 near the periphery of the PRLA. Sampling results indicate that the water is magnesium-sulfate type.

Conductivity values resulting from the 1983 and 1984 field monitoring varied from 695 to 1,290 μmhos/cm, which indicates total dissolved solid (TDS) values between 380 to 910 mg/l (Hem 1970)(CDM 1984a). TDS values recorded at USGS station 09250400 in water year 1976 ranged from 912 (July 1976) to 1,080 mg/l (May 1976) (USGS 1977).

Flows recorded during the field monitoring ranged from 1.84 (August 1984) to 27.4 (May 1984) cfs. Average 24-hour discharge values recorded at USGS station 09250400 in water year 1976 ranged from 0.44 (September 1976) to 3.3 cfs (April 1976) (USGS 1977).

The water quality use classifications for Good Spring Creek are: Recreation, Class II; Warm Water Aquatic life, Class II; and Agriculture.

Water from Good Spring Creek is primarily used for irrigation, stock, and wildlife purposes. Adjudicated water rights on sources located within or near the Good Spring Creek watershed are listed in table 3-4 and shown on map 3-2.



Map 3-2 Adjudicated Water Rights

TABLE 3-4
GOOD SPRING CREEK WATERSHED—ADJUDICATED WATER RIGHTS WITHIN AND NEAR PRLA AND FEDERAL LEASE C-093713

Name	*Location*	*Use*	*Amount (cfs)**
Y-1 Spr.	NE¼SE¼ sec. 10, T. 2 N., R. 93 W. (near study area)	livestock	0.033
Pollard Spr. #1	NW¼SW¼ sec. 10, T. 2 N., R. 93 W. (near study area)	livestock	0.013
Y-4 Spr.	SW¼SW¼ sec. 11, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033
Y-2 Spr.	NW¼SW¼ sec. 11, T. 2 N., R. 93 W. (near study area)	livestock	0.033
Y-10 Spr.	NW¼SW¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033
Y-9 Spr.	SW¼NW¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033
Y-8 Spr.	NW¼NW¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033
Y-7 Spr.	NW¼NW¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033
Y-5 Spr.	NE¼NW¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033
Y-6 Spr.	NW¼NE¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033
Jensen No. 2 Well	SW¼NW¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	irrigation, livestock	1.34
Jensen No. 3 Well	SW¼NW¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	irrigation, livestock	0.013
Jensen No. 1 Well	SE¼NW¼ sec. 14, T. 2 N., R. 93 W. (in PRLA)	irrigation, livestock	0.013
Durham Spr. 1	NE¼SW¼ sec. 14, T. 3 N., R. 93 W. (near study area)	livestock	0.11
AQ No. 2 Ditch	NE¼SW¼ sec. 14, T. 3 N., R. 93 W. (near study area)	irrigation	9.5
AQ No. 2 Suppl. Hgt	NE¼SW¼ sec. 14, T. 3 N., R. 93 W. (near study area)	irrigation	4.2
AQ No. 1 Ditch Hgt 3	SE¼SE¼ sec. 15, T. 3 N., R. 93 W. (near study area)	irrigation	8.2
AQ No. 1 Ditch Hgt 2	SW¼SE¼ sec. 15, T. 3 N., R. 93 W. (near study area)	irrigation	7.56
James Pipeline	SE¼SE¼ sec. 15, T. 3 N., R. 93 W. (near study area)	irrigation, livestock	1.00
AQ Ditch	SE¼SE¼ sec. 21, T. 3 N., R. 93 W. (near study area)	irrigation	4.17
Durham Spr. No. 2	SE¼NW¼ sec. 22, T. 3 N., R. 93 W. (near study area)	irrigation, livestock	0.50
Kourlis Spr. #6	NW¼SW¼ sec. 23, T. 3 N., R. 93 W. (near study area)	livestock	0.033
H Kourlis Ranch Spr. #22	SW¼NE¼ sec. 33, T. 3 N., R. 93 W. (near study area)	livestock	0.033
Freund D. #2	SE¼SW¼ sec. 33, T. 3 N., R. 93 W. (near study area)	irrigation	0.30
Freund D. #3	NW¼SE¼ sec. 33, T. 3 N., R. 93 W. (near study area)	irrigation	0.30
Freund D. #4	NW¼SE¼ sec. 33, T. 3 N., R. 93 W. (near study area)	irrigation	0.30

Source: Colorado Division of Water Resources 1984 and 1985

*cfs = cubic feet/second

Curtis Creek

The Curtis Creek watershed encompasses approximately 16.5 square miles. Approximately 3.5 percent of the total watershed is contained within the PRLA. The watershed area within the PRLA is 0.59 square miles, or 7.4 percent of the total PRLA area (CDM 1984a). The Curtis Creek watershed drains the extreme southwestern corner of the PRLA. Curtis Creek flows in a southwesterly direction and eventually empties into the White River, about 1 mile east of Meeker.

The PRLA encompasses a portion of the upland areas of Curtis Creek. The areas are characterized by flat, marshy channels with gentle gradients and natural ponds.

Water quality data are available from USGS Station No. 09304550, about 9 miles downstream from the PRLA. The water appears to be a magnesuim-sulfate type, with total dissolved solid concentrations ranging from 990 mg/l (October 1981) to 9,150 mg/l (December 1978). The total dissolved solid concentrations are abnormally high for this area (USGS 1981, USGS 1979).

Little or no flow occurs in the portions of Curtis Creek within the PRLA. Flows recorded at USGS Station No. 09304550 ranged from 0.02 cfs (July 1978) to 5.8 cfs (May 1980) (USGS 1979, USGS 1981).

The water quality use classifications for Curtis Creek are Recreation, Class II; Cold Water Aquatic Life, Class II; and Agriculture.

Table 3-5 lists the adjudicated water rights for the Curtis Creek drainage. The locations of the water sources are presented on map 3-2.

TABLE 3-5
CURTIS CREEK WATERSHED—ADJUDICATED WATER RIGHTS WITHIN AND NEAR PRLA AND FEDERAL LEASE C-093713

Name	*Location*	*Use*	*Amount (cfs)**
Bradford Spr. W-1	SE¼NW¼ sec. 15, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033
Bradford Spr. W-2	NW¼SW¼ sec. 15, T. 2 N., R. 93 W. (near study area)	livestock	0.033
Helen Jensen Spr. #3	SE¼SW¼ sec. 15, T. 2 N., R. 93 W. (in PRLA)	irrigation, livestock	0.02
Ninemile Ranch Res. #1	SW¼SE¼ sec. 16, T. 2 N., R. 93 W. (near study area)	combination	40.71
Ninemile Ranch Res. #1	SW¼SE¼ sec. 16, T. 2 N., R. 93 W. (near study area)	combination	26.41
Ninemile Ranch Res. #2	NW¼NE¼ sec. 22, T. 2 N., R. 93 W. (near study area)	irrigation, recreation, livestock	6.31
Ninemile Ranch Irr. Sys.	NW¼NE¼ sec. 22, T. 2 N., R. 93 W. (near study area)	irrigation	6.40
Y-3 Spring	SE¼SW¼ sec. 11, T. 2 N., R. 93 W. (in PRLA)	livestock	0.033

Source: Colorado Division of Water Resources 1984 and 1985

*cfs = cubic feet/second

Ninemile Draw

The Ninemile Draw watershed encompasses approximately 5 square miles. Approximately 33 percent of the total watershed lies within the project area. Approximately 1.3 percent of the PRLA is occupied by this watershed (CDM 1984a). The Ninemile Draw watershed drains the southeastern portions of the PRLA and Federal lease C-093713. The waters in Ninemile Draw eventually flow into Coal Creek, Beaver Creek, and the White River.

Portions of the headwaters are encompassed by the PRLA and adjacent Federal leases. The majority of these segments are characterized by broad, flat, marshy areas with natural ponds, and relatively gentle channel gradients.

No water quality or measured flow data are available on Ninemile Draw. Field observations indicate marginal flows in the upstream segments (CDM 1984a).

The water quality use classifications for tributaries of Big Beaver Creek are: Recreation, Class II; Cold Water Aquatic Life, Class I; Water Supply; and Agriculture.

Water use in Federal lease C-093713, which is adjacent to the PRLA, is primarily for irrigation, livestock, wildlife, and domestic purposes. Adjudicated water rights located within or near the project area are tabulated in table 3-6. The locations of the water sources are depicted on map 3-2.

TABLE 3-6
NINEMILE DRAW WATERSHED—ADJUDICATED WATER RIGHTS WITHIN OR NEAR PRLA AND FEDERAL LEASE C-093713

Name	*Location*	*Use*	*Amount (cfs)**
Sheridan Spr. #1	SE¼SW¼ sec. 13, T. 2 N., R. 93 W. (in lease C-093713)	livestock	0.002
Bradford Spr. W-3	SW¼NE¼ sec. 13, T. 2 N., R. 93 W. (in lease C-093713)	livestock	0.033
Bradford Spr. W-4	SE¼SE¼ sec. 14, T. 2 N., R. 93 W. (in lease C-093713)	livestock	0.033
Helen A. Jensen Spr. #1	NE¼NE¼ sec. 14, T. 2 N., R. 93 W. (near study area)	irrigation, livestock	0.02
Helen A. Jensen Well #7	NE¼NE¼ sec. 24, T. 2 N., R. 93 W. (near study area)	irrigation, livestock	0.33

Source: Colorado Division of Water Resources 1984 and 1985

*cfs = cubic feet/second

Elkhorn Creek

Approximately 5 percent of the Elkhorn Creek watershed lies in the extreme northeast corner of the PRLA. The watershed occupies 3.2 percent of the PRLA (CDM 1984a). Elkhorn Creek is tributary to Good Spring Creek. Elkhorn Creek is ephemeral within the PRLA, with flows induced only by snowmelt and thunderstorms. Channels are incised in the erosion-resistant bedrock, and the side slopes are steep (CDM 1984a).

Table 3-7 lists the adjudicated water rights within or near the project area (see map 3-2).

TABLE 3-7
ELKHORN CREEK WATERSHED—ADJUDICATED WATER RIGHTS
WITHIN AND NEAR PRLA AND FEDERAL LEASE C-093713

Name	*Location*	*Use*	*Amount (cfs)**
H Kourlis Ranch #2 Spring	SE¼NW¼ sec. 13, T. 3 N., R. 93 W. (near study area)	irrigation, livestock	0.033
H Kourlis Ranch #52 Spring	SE¼SE¼ sec. 23, T. 3 N., R. 93 W. (near study area)	livestock	0.033
H Kourlis Ranch #5 Spring	NE¼SE¼ sec. 23, T. 3 N., R. 93 W. (near study area)	irrigation, livestock	0.05
H Kourlis Ranch #8 Spring	SE¼SW¼ sec. 24, T. 3 N., R. 93 W. (near study area)	livestock	0.033
H Kourlis Ranch #3 Spring	NW¼NW¼ sec. 24, T. 3 N., R. 93 W. (near study area)	irrigation, livestock	0.033
H Kourlis Ranch #4 Spring	NW¼NW¼ sec. 24, T. 3 N., R. 93 W. (near study area)	irrigation, livestock	0.033
H Kourlis Ranch #9 Spring	NW¼NW¼ sec. 25, T. 3 N., R. 93 W. (near study area)	livestock	0.10
H Kourlis Ranch #50 Spring	SE¼NE¼ sec. 26, T. 3 N., R. 93 W. (near study area)	livestock	0.033

Source: Colorado Division of Water Resources 1984 and 1985

*cfs = cubic feet/second

Little Creek

Approximately 18 percent of the watershed lies within the project area. Approximately 5.6 percent of the PRLA is occupied by this drainage. The Little Creek watershed drains the extreme northeast corner of the PRLA and flows northward into Milk Creek.

The segments of Little Creek encompassed by the lease boundaries are ephemeral and respond to snowmelt and localized thunderstorms. The channels are steep, vertically incised in erosion-resistant bedrock, and are bordered by steep side slopes.

Table 3-8 lists the adjudicated water rights within and near the project area (see map 3-2).

TABLE 3-8
LITTLE CREEK WATERSHED—ADJUDICATED WATER RIGHTS
WITHIN AND NEAR PRLA AND FEDERAL LEASE C-093713

Name	*Location*	*Use*	*Amount (cfs)**
Kourlis Ranch Ditch #4	NE¼NW¼ sec. 19, T. 3 N., R. 92 W. (near study area)	irrigation, livestock	1.0
H Kourlis Ranch #18 Spr.	NW¼NE¼ sec. 30, T. 3 N., R. 92 W. (near study area)	livestock	0.08
H.A. Bradford Spr. #1	SW¼SW¼ sec. 31, T. 3 N., R. 92 W. (near study area)	livestock	0.02
H.A. Bradford Spr. #2	NW¼SW¼ sec. 31, T. 3 N., R. 92 W. (near study area)	livestock	0.02
H Kourlis Ranch #17 Spr.	SE¼SE¼ sec. 25, T. 3 N., R. 93 W. (near study area)	livestock	0.20
H Kourlis Ranch #12 Spr.	NE¼SW¼ sec. 36, T. 3 N., R. 93 W. (near study area)	livestock	0.10
H Kourlis Ranch #13 Spr.	NE¼SW¼ sec. 36, T. 3 N., R. 93 W. (in PRLA)	livestock	0.10

Source: Colorado Division of Water Resources 1984 and 1985

*cfs = cubic feet/second

Environmental Consequences

Impacts

No Development Alternatives. Under the No Development alternatives, the surface water quality and quantity would remain similar to past and present conditions. Continued management practices associated with undeveloped rangeland would have no significant adverse impacts to surface water resources. The area would continue to be used by livestock and wildlife.

Development Alternatives. With development, approximately 60 percent of the James Creek watershed would be mined and the current hydrologic regime of the James Creek watershed would be altered. The alteration would result from several factors. First, changes in the premining vegetation of trees and shrubs to the postmining grasses would increase solar radiation and result in earlier snowmelts, earlier peak flows, and decreased evapotranspiration and interception. Second, the peak flows would be less than those during the premining years because water would move more freely into the groundwater system, which would consist of an extensive spoils aquifer. Third, mean annual runoff would increase as a result of the changes in vegetation species composition and soil characteristics. Fourth, the excavation of a part of the current aquifer system would initially decrease baseflows. Shortly after reclamation, however, higher baseflows would occur in the lower half of James Creek where the base of the spoils aquifer is at or above the James Creek valley. Based on preliminary BLM calculations, between 40 and 400 years would be required before the headwaters of James Creek received baseflows from the spoils aquifer. In the SE¼ of section 3, and sections 10, 11, and 12 of T. 2 N., R. 93 W., the base of the spoils aquifer would be approximately 50 to 500 feet below the James Creek channel. Assuming that water would percolate vertically to the base of the reclaimed overburden and flow along structurally controlled gradients, and that it would not contact permeable or semi-permeable layers, decades would be required before a zone of saturation in the spoils aquifer would contact the incised valley of upper James Creek. The combined overall effect would significantly alter the present hydrologic characteristics of the James Creek watershed.

Changes in the hydrologic regimes of the Good Spring Creek, Elkhorn Creek, Little Creek, Curtis Creek, and Ninemile Draw watersheds would be negligible.

Mining would remove portions of the natural drainages in the James Creek, Good Spring Creek, Little Creek, and Elkhorn Creek watersheds. OSM regulations require that mined lands be returned to their approximate original contour (30 CFR 8125.133 1984) and CMLRD regulations require that stream channels be reconstructed to approximately their premined condition (CMLRD Regulations 4.05.4 1980). However, losses to beaver habitats and populations and alteration of the present Williams Fork aquifer system might preclude successful restoration of the present drainage system of James Creek.

Changes in the overall channel characteristics of Good Spring Creek, Little Creek, and Elkhorn Creek would be negligible. No impacts would occur to the Curtis Creek and Ninemile Draw channels.

Changes in the natural sediment aggregation/degradation patterns of portions of the James Creek, Good Spring Creek, Elkhorn Creek, and Little Creek watersheds would occur. The concentration of transportation along the James Creek mainstem could indirectly decrease channel stability and increase streambank erosion of James Creek. Total suspended solid levels (TSS) would increase on-site during the mining and reclamation phases. TSS levels would return to premining levels upon successful establishment of the vegetative and structural reclamation measures. OSM and CMLRD regulations require that runoff from disturbed surface areas be passed through sedimentation ponds or similar treatment facilities (30 CFR 816.45, 816.46 1984, CMLRD Regulations 4.05.2 1980). Therefore, sediment contributions to areas outside the project area should be negligible during the entire mining operation.

Mining would alter existing water quality both during and after mining. Past studies have indicated increases in surface water total dissolved solid (TDS) concentrations resulting from coal mining (GRHF II DEIS BLM 1983, NW Colorado Coal EIS BLM 1976a, GRHF FEIS BLM 1980, NW Supplemental Report BLM 1978, McWhorter et al. 1979, and Williams 1985).

The introduction of the spoils aquifer and resultant increases in groundwater residence times and opportunities for ion dissolution would contribute to increases in TDS values in surface water located on the project area and its general periphery. Spoils aquifer water could contain TDS concentrations of approximately 3,000 to 3,900 mg/l, depending on the water's residence time in the reclaimed spoil pile and the properties of the spoil material.

In addition to the TDS contributions from the reclaimed spoil pile, dissolved solids would be directly contributed to the James Creek headwaters from the overburden stockpile during the actual mining phase.

Under the current mining proposal, the overburden would be stockpiled in the James Creek headwaters in sections 11 and 12 of T. 2 N., R. 93 W. In section 12, the headwaters are ephemeral and Consol might need to divert water away from the disturbed area, pursuant to CMLRD regulation 4.05.3. The headwaters become perennial in section 11 and any mining disturbance must meet the CMLRD stream buffer zone regulation of 4.05.18.

Elevated levels of TDS would occur in James Creek during the summer and fall months, when the majority of water present in James Creek would come from groundwater sources. Dilution from snowmelt would significantly reduce TDS values in the spring and early summer months. Elevated TDS levels would also occur in Good Spring Creek; however, the increases would not be as dramatic as those occurring in James Creek. Slight increases in TDS values might occur in Elkhorn Creek and Little Creek. No noticeable increases would occur in Curtis Creek or Ninemile Draw.

OSM and CMLRD regulations require that discharges of water from areas disturbed by surface coal mining must comply with all applicable Federal and state water quality standards (30 CFR 816.42 1984, CMLRD Regulations 4.05.2 1980). The Colorado Department of Health has adopted a "no salt return where practicable" policy for municipal and industrial dischargers of dissolved solids. If an industrial source emits more than 1 ton per day or 350 tons per year of dissolved solids to the Colorado River mainstem, the operator may be required to perform an analysis to determine whether or not it would be feasible to decrease the effluent load ("Regulations for Implementation of the Colorado River Salinity Standards Through the NPDES Program" 5 CCR 1002-11). With the exception of this regulation, the state of Colorado has not adopted a specific quantitative standard regarding TDS.

A 1979 EPA report indicates that a volume of water equal to about 6.8 times the bulk volume of the spoil material is needed to reduce the electrical conductivity of the spoil leachate to 5 percent of the conductivity of the original material (McWhorter et al. 1979). Based on this study, and assuming that the average depth of the spoil pile is approximately 400 feet, that recharge to the spoil aquifer is approximately 6 inches per year, that conductivity values are linearly correlatable to TDS values, and that natural weathering does not contribute to TDS values, then approximately 5,000 years will be required to reduce TDS values by 95 percent. It is important to note, however, the 1979 EPA study also indicates that a volume of water equal to about one pore volume must be passed through the spoil material before an appreciable reduction in the dissolved solids concentration of the leachate occurs (McWhorter et al. 1979). Therefore, assuming porosity values range from 0.2 to 0.5, significant reductions in TDS values will occur 15 to 30 years after mining.

OSM and CMLRD regulations require that compensation be given to the owner of a water right if a water supply is contaminated, diminished, or interrupted from a coal mining operation (30 CFR 715.17(l), 30 CFR 816.41(n) 1984, CMLRD Regulations 1.12, 4.05.15 1980). The diversions of James Creek water in section 22, T. 3 N., R. 93 W., could be affected by the proposed coal operation, since the natural flow patterns and water quality of James Creek would be altered.

In addition, the diversions removing water from Good Spring Creek in sections 14, 15, 21, and 22 of T. 3 N., R. 93 W., could be impacted by attenuation or contamination of flows. Impacts to other water rights are discussed in the Groundwater section of this document.

The short-term use of the tract for coal extraction would have a long-term impact on the productivity of local and regional surface water sources. Water leaching from the spoils aquifer would increase TDS concentrations in James Creek, Good Spring Creek, Elkhorn Creek, and Little Creek. These increases would contribute to the long-term cumulative effects of additional salt loading in the Colorado River Basin. Increased TDS contributions to the Colorado River Basin would be irretrievable.

Conclusion

The hydrologic characteristics of the James Creek watershed would be altered under the proposed mining scenario. Increases in TDS concentrations are anticipated for waters found in the James Creek, Good Spring Creek, Elkhorn Creek, and Little Creek watersheds. Local increases in TDS values might contribute to a cumulative, regional increase in TDS values. Water-rights compensation might be required for owners of local water rights in accordance with applicable law.

GROUNDWATER

Affected Environment

The PRLA site and adjacent Federal lease C-093713 are located in the southeastern sector of the Danforth Hills area. The Williams Fork and Iles formations of the Cretaceous age Mesaverde Group are the area's geologic units. The axis of the Ninemile (Danforth)

Anticline is near the center of the PRLA. The axis of the Sulfur Creek Syncline generally delineates the southern PRLA boundary, and the Elkhorn Syncline is about 1 mile north of the PRLA.

The Williams Fork Formation is characterized by alternating beds of sandstones, shales, siltstones, and coal. The sandstone strata are typically fine to medium grained, calcareous, and lenticular in form. The water bearing sandstone intervals are discontinuous and not extensively laterally correlatable. The regionally important Twenty-Mile Sandstone aquifer of the Williams Fork Formation does not occur within the project area.

Thirteen springs designated JC1 through JC13, which emanate from the perched aquifer system of the Williams Fork Formation, were identified and monitored in 1983 and 1984 (map 3-3) (CDM 1984a).

Based on the field measurements, the electrical conductivity of the water ranged from 490 to 3,950 μmhos/cm. The pH values from the springs were relatively uniform, ranging from 7.5 to 8.5 (CDM 1984a). The conductivity values are considered representative of TDS concentrations on the order of 270 to 2,960 mg/l (Hern 1970). The overall bedrock water quality depends on the chemistry of overburden, coal, and interburden strata. The flows of the springs (JC1 to JC13) measured in 1983 and 1984 varied from 0.5 gallons per minute (gpm) to 31.8 gpm (table 3-9) (CDM 1984a).

Precipitation infiltration is the dominant recharge mechanism on the PRLA and surrounding areas. Discharge occurs via spring flow. Because of the discontinuous nature of the Williams Fork Formation aquifers, both recharge and discharge are likely local phenomena. Infiltrating precipitation percolates downward in recharge areas. Groundwater flow then apparently follows localized fracture or structurally controlled gradients, discharging where down-dip strata intersect valley sides. Flow in the uppermost water bearing intervals is controlled by topographic conditions and the continuity of fractures. Deep zones probably exhibit flow away from the Ninemile Anticline toward both the Elkhorn and Sulfur Creek synclines. The residence time of the water in the Williams Fork aquifers is not very long. Spring discharge locations often occur above areas with significant accumulations of unconsolidated debris. Many of the landforms extend to the valley bottom and serve as important recharge conduits from bedrock springs to the alluvial deposits of the James Creek Valley.

The amount of groundwater contributed to three nearby segments of mountain streams situated in the Williams Fork Formation (Fish Creek near Milner, East Fork of Williams Fork above Willow Creek, and East Fork of Williams Fork near Pagoda) is estimated to range from 25 percent to 31 percent of total stream discharge (USGS 1972). Values similar to these most likely exist for the creeks and Federal lease C-093713.

In addition to the water present in the perched aquifer system of the Williams Fork Formation, groundwater also flows through the alluvial lowland of James Creek. The alluvial area ranges from less than 50 to as much as 250 feet in width. The alluvial thickness may exceed 30 to 40 feet in some areas. Most likely, all but the upper 10 to 15 feet of the alluvial deposits are saturated. Seeps are common in the lower

TABLE 3-9
SPRING MONITORING RESULTS

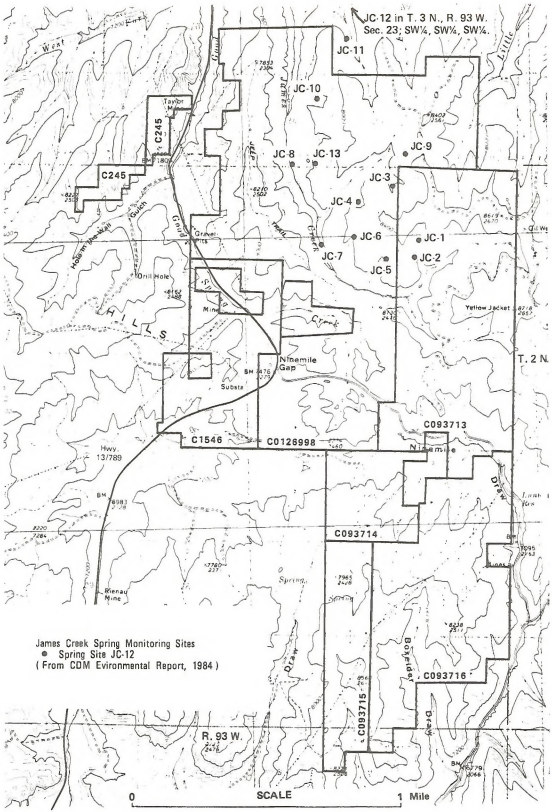
Spring	Discharge (gpm)[c]			Conductivity (μmhos/cm)[a]			pH		
Name	Aug. 1983	Nov. 1983	July 1984	Aug. 1983	Nov. 1983	July 1984	Aug. 1983	Nov. 1983	July 1984
JC-1	3.2	dry	5.5	580	ND	575	7.7	ND	7.9
JC-2	8.8	5.0	10.3	600	1115	625	7.9	8.0	7.9
JC-3	4.2	dry	6.0	495	ND	490	8.3	ND	8.3
JC-4	4.9	ND[b]	7.8	685	ND	700	8.5	ND	8.3
JC-5	6.3	4.5	6.2	735	720	800	7.9	8.0	7.8
JC-6	6.0	ND	5.2	735	ND	725	7.8	ND	8.1
JC-7	0.5	dry	0.6	1730	ND	1880	8.4	ND	8.2
JC-8	0.5	dry	0.8	3950	ND	3800	7.5	ND	7.9
JC-9	8.6	ND	9.5	1530	ND	1290	8.4	ND	8.5
JC-10	8.5	0.2	10.9	980	1000	980	8.0	8.6	8.1
JC-11	19.9	2.0	24.0	1560	1470	1620	7.7	7.6	7.9
JC-12	22.3	2.6	31.8	2030	1650	2060	8.4	8.5	8.4
JC-13	ND	ND	10.4	ND	ND	1170	ND	ND	8.3

[a] μmhos/cm = conductivity values corrected to 25 degrees C

[b] ND = no data available

[c] gpm = gallons per minute

(CDM 1984a)



Map 3-3 James Creek Spring Monitoring Sites

sections of the streambanks, and the valley meadow and wetland vegetation indicates a shallow water table.

Water table levels fluctuate seasonally. Because the flooding in 1984 scoured portions of the alluvium and breached some beaver dams, the amount of water flowing through the alluvial aquifer is less than the amounts of previous years.

Additional information about the James Creek alluvial valley can be found in the Alluvial Valley Floor section of this document.

The Iles Formation lies below the Williams Fork Formation. The uppermost sandstone of the Iles Formation is the Trout Creek Sandstone Member, an important regional aquifer. Although the Trout Creek Sandstone Member underlies the entire project area, at depths ranging from 80 to 1,000 feet, no outcrops occur.

Adjudicated water rights on groundwater sources located within or near the PRLA and Federal lease C-093713 are listed in tables 3-3 and 3-8, located in the Surface Water section of this document.

Environmental Consequences

Impacts

The flow of existing springs in or near the proposed mining area would be displaced, reduced, or eliminated.

Total dissolved solid concentrations would increase in the study area's groundwater.

Mining would change present aquifer properties and groundwater flow patterns.

Water rights (which are not acquired by the mining operator) may require compensation if these water supplies are contaminated, diminished, or interrupted.

No Action/No Development Alternatives. The quality and quantity of the project area's groundwater resources would remain similar to past and present conditions. Management practices associated with undeveloped rangeland would continue, with no significant adverse impacts to groundwater resources.

Development Alternatives. The alteration of the project area's Williams Fork Formation aquifers and/or their recharge areas would displace, reduce, or eliminate the flows of the springs and seeps present within the mined area and in the general periphery (see map 3-4).

Under the current mining proposal, the following springs would be removed.

H. Kourlis Ranch #11 Spring NE¼SE¼ sec. 34, T. 4 N., R. 93 W.

H. Kourlis Ranch #16 Spring SW¼SE¼ sec. 35, T. 3 N., R. 93 W.

H. Kourlis Ranch #15 Spring NE¼SE¼ sec. 35, T. 3 N., R. 93 W.

JC-10 Spring SE¼NE¼ sec. 34, T. 3 N., R. 93 W.

JC-13 Spring SE¼SE¼ sec. 34, T. 3 N., R. 93 W.

JC-9 Spring SE¼SE¼ sec. 35, T. 3 N., R. 93 W.

JC-3 Spring NW¼NE¼ sec. 2, T. 2 N., R. 93 W.

JC-4 Spring SW¼NW¼ sec. 2, T. 2 N., R. 93 W.

JC-6 Spring NE¼SE¼ sec. 2, T. 2 N., R. 93 W.

JC-5 Spring SW¼SE¼ sec. 2, T. 2 N., R. 93 W.

JC-1 Spring NE¼SE¼ sec. 2, T. 2 N., R. 93 W.

JC-2 Spring SE¼SE¼ sec. 2, T. 2 N., R. 93 W.

H. Kourlis Ranch #13 Spring NE¼SW¼ sec. 36, T. 3 N., R. 93 W.

In addition, because of the removal of portions of their recharge areas, the following springs could have their flows reduced, as a result of the mining operation.

H. Kourlis Ranch #14 Spring SE¼SW¼ sec. 26, T. 3 N., R. 93 W.

H. Kourlis Ranch #50 Spring SE¼NE¼ sec. 26, T. 3 N., R. 93 W.

H. Kourlis Ranch #7 Spring (JC-11) NW¼SW¼ sec. 26, T. 3 N, R. 93 W.

H. Kourlis Ranch #22 Spring SW¼NE¼ sec. 33, T. 3 N., R. 93 W.

JC-7 Spring SE¼SE¼ sec. 3, T. 3 N., R. 93 W.

JC-8 Spring SW¼SE¼ sec. 34, T. 3 N., R. 93 W.

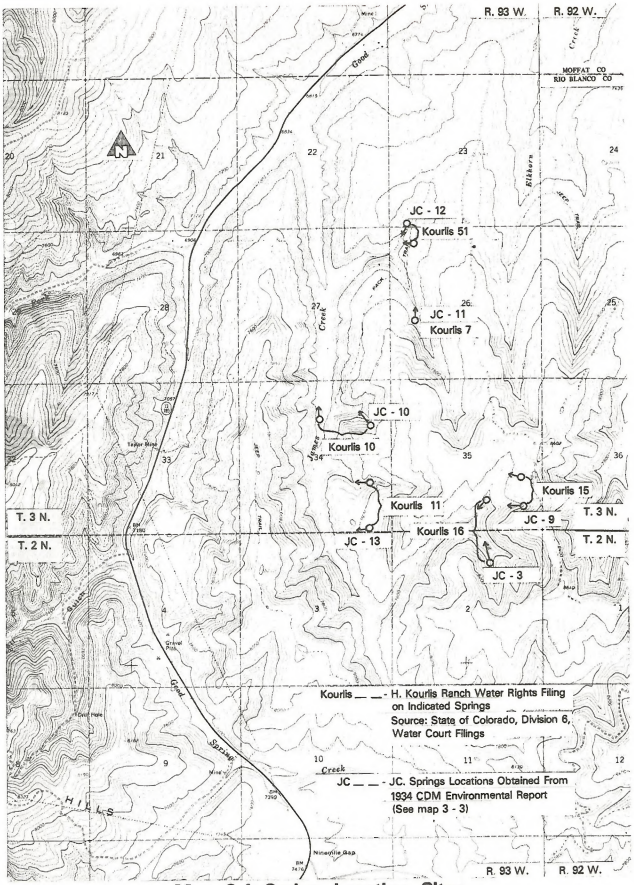
H. Kourlis Ranch #10 Spring NW¼NE¼ sec. 34, T. 3 N., R. 93 W.

H. Kourlis Ranch #12 Spring NE¼SW¼ sec. 36, T. 3 N., R. 93 W.

H.A. Bradford Spring 1 SW¼SW¼ sec. 31, T. 3 N., R. 92 W.

H.A. Bradford Spring 2 NW¼SW¼ sec 31, T. 3 N., R. 92 W.

Changes in aquifer properties and groundwater flow patterns would result from disturbing the overburden during mining and subsequent reclamation efforts. The spoil materials would have a much higher vertical permeability, and groundwater would be recharged to the depth of the spoil materials instead of moving laterally along the highest impermeable shale layers (McWhorter et al. 1979). New springs might emanate from contact surfaces between the reclaimed overburden and less permeable unmined areas, or from a point where a valley intersects one of the spoil



Map 3-4 Spring Location Sites

0 SCALE 1 Mile

aquifer's zones of saturation. New springs might also appear where the spoil aquifer hydraulically communicated with an aquifer of similar properties and water traveled laterally in a structurally controlled direction (down-dip) and discharged off-site. The appearance of new springs depends on numerous variables, including the depth of spoil materials, heights of the spoil aquifers zones of saturation, the properties of the spoil material and adjacent geology, and the time necessary for spoil aquifer resaturation.

Changes would occur in the current groundwater flow contributions to James Creek. In the southeastern portion of the mined area, the bottom of the mine pit would be approximately 50 to 500 feet below the James Creek channel. Although groundwater movement is anticipated to be in a down-dip direction toward the channel, decades might be required to resaturate the spoils aquifer before the water level is at the same elevation as that of upper James Creek. Preliminary BLM computations indicate that resaturation of the spoils aquifer in the upper portions of the James Creek Watershed would take between 40 and 400 years, assuming the spoils aquifer is isotropic, homogeneous, unconfined, and possesses an impermeable boundary (McWhorter et al. EPA 1982).

The northern section of the mined area would have pit depths above or equal the James Creek valley. Groundwater discharges into the northern end of James Creek would occur shortly after reclamation. Groundwater contributions from the spoils aquifer would appear in section 3, T. 2 N., R. 93 W., and sections 34 and 27, T. 3 N., R. 93 W.

A situation related to this scenario recently occurred at the Energy Mine No. 1, located near the town of Oak Creek. The spoil pile was located above the elevation of the Foidel Creek channel. Approximately 7 years after mining was completed, groundwater began discharging from the spoil pile into Foidel Creek.

Changes in the existing groundwater quality of the project area and its periphery would also occur under the development alternatives. Currently, groundwater has minimal contact with the natural stratigraphic sequences of sandstones, shales, and coal seams. After reclamation, however, the water would percolate deep through the unconfined spoils aquifer and would have greater opportunities for dissolving soluble minerals. This leaching would increase groundwater concentrations of TDS.

Studies of existing and simulated mining situations that are similiar to the proposed Consol operation report that postmining spoils aquifer groundwater TDS concentrations can range from approximately 2,000 mg/l to 3,900 mg/l (Parker and Norris 1983, McWhorter et al. 1979, Peabody Coal Company 1985, Pittsburgh and Midway Coal Mining Company 1985, Getty Oil Company 1985, and Williams 1985). Therefore, the TDS concentration of the mined area's groundwater might range from 3,000 to 3,900 mg/l, the variability is dependent on the water's residence times and the chemical and physical properties of the spoil.

The ions primarily responsible for contributing to the TDS content would be calcium, sodium, magnesium, bicarbonate, and sulfate. The increased TDS values of the groundwater and receiving surface waters could adversely impact water users. The Colorado West Area's 208 Plan recommended a maximum of 3,000 mg/l TDS for livestock use (CWACOG 208 Plan, 1979), and the high TDS groundwater values might affect the local area's livestock and wildlife use. In addition, the effects of leachate movement into nearby perennial and ephemeral stream channels may be detrimental to nearby irrigated crops. The EPA and Colorado West Area Council of Governments state that water with TDS values ranging between 1,000 and 2,000 mg/l may have adverse effects on many crops and therefore, requires careful management practices. Water with TDS concentrations of 2,000 to 5,000 mg/l can only be used for tolerant plants on permeable soils (EPA 1976, CWACOG 208 Plan 1979). Of particular concern would be the water flowing in James Creek and immediately downstream in Good Spring Creek. During the spring and early summer when James Creek would be supplied with water primarily from snowmelt (through overland flow and interflow processes), groundwater discharge should be significantly diluted. However, during the summer and early fall months, groundwater contained in the spoils aquifer and James Creek alluvium would supply a significant percentage of the James Creek flow. Elevated TDS concentrations could be limiting to users of James Creek and Good Spring Creek water.

In addition, the higher TDS concentrations might contribute to cumulative, regional increases in TDS values of the Colorado River Basin. The Colorado Department of Health has adopted a "no salt return where practicable" policy for municipal and industrial dischargers of dissolved solids. If an industrial source emits more than 1 ton per day, or 350 tons per year, of dissolved solids to the Colorado River mainstem, the operator might be required to perform an analysis to determine whether or not it would be feasible to decrease the effluent load ("Regulations for Implementation of the Colorado River Salinity Standard Through the NPDES Program" 5 CCR 1002-11). With the exception of this regulation, the state of Colorado has not adopted a specific quantitative standard regarding TDS.

OSM and CMLRD regulations require that compensation be given to the owner of a water right if a water supply has been contaminated, diminished, or interrupted from a coal mine operation (30 CFR 715.17(i), 30 CFR 816.41(h) 1984; CMLRD Regulations 1.12, 4.05.15 1980). Under the current mining proposal, the following adjudicated water sources would be removed and the holders of the adjudicated water rights would require compensation.

H Kourlis Ranch #11 Spring NE¼SE¼ sec. 34, T. 3 N., R. 93 W., 0.04 cfs

H Kourlis Ranch #16 Spring SW¼SE¼ sec. 35, T. 3 N., R. 93 W., 0.03 cfs

H Kourlis Ranch #15 Spring NE¼SE¼ sec. 35, T. 3 N., R. 93 W., 0.03 cfs

H Kourlis Ranch #13 Spring NE¼SW¼ sec. 36, T. 3 N., R. 93 W., 0.10 cfs

Jensen No. 4 Well SW¼SE¼ sec. 1, T. 2 N., R. 93 W., 0.013 cfs

Jensen No. 1 Well NW¼NW¼ sec. 1, T. 2 N., R. 93 W., 0.013 cfs

In addition, flows might be attenuated during dry months in the following adjudicated water sources, and the holders of the adjudicated water rights would require compensation.

H Kourlis Ranch #14 Spring SE¼SW¼ sec. 26, T. 3 N., R. 93 W., 0.03 cfs

H Kourlis Ranch #50 Spring SE¼SW¼ sec. 26, T. 3 N., R. 93 W., 0.033 cfs

H Kourlis Ranch #7 Spring NW¼SW¼ sec. 26, T. 3 N., R. 93 W., 0.01 cfs

H Kourlis Ranch #22 Spring SW¼NE¼ sec. 33, T. 3 N., R. 93 W., 0.033 cfs

H Kourlis Ranch #10 Spring NW¼NE¼ sec. 34, T. 3 N., R. 93 W., 0.70 cfs

H Kourlis Ranch #12 Spring NE¼SW¼ sec. 36, T. 3 N., R. 93 W., 0.10 cfs

H.A. Bradford Spring 1 SW¼SW¼ sec. 31, T. 3 N., R. 92 W., 0.08 cfs

H.A. Bradford Spring 2 NW¼SW¼ sec. 31, T. 3 N, R. 92 W., 0.02 cfs

AQ No. 1 Ditch SE¼NW¼ sec. 22, T. 3 N., R. 93 W., 5.30 cfs

AQ No. 1 Ditch HGT No. 1 SE¼NW¼ sec. 22, T. 3 N., R. 93 W., 1.80 cfs

Also, if sources (ditches, springs, reservoirs, and wells) within the general periphery of the mined area experience elevated TDS or other contaminant levels, compensation to the water right holder would also be required.

Compensation would not be required if Consol purchased water rights from the current holders.

Preliminary findings indicate that the Trout Creek Sandstone Member would not be impacted, as it lies 118 to 215 feet below the last minable seam and is separated from the coal by interbedded sandstones and shales, and because no Trout Creek Sandstone outcrops are present in the project area. However, due to the structural contortions of the area, fracture systems could exist between the Trout Creek Member and the overlying Williams Fork Formation. Additional data would be required to determine the existence of fracturing. If fracturing were apparent, the Trout Creek Sandstone Member would be adversely affected by the mining operations.

The short-term use of the area for coal extraction would have a long-term impact on groundwater productivity. Groundwater in and near the mine area would be significantly degraded by the increase in TDS concentrations. Availability of groundwater in the southeastern portion of the mined area might be limited for 40 to 400 years, until the spoils aquifer became resaturated and water could be readily extracted.

Alteration of the project area's Williams Fork aquifer system would be an irretrievable impact. The increased salt load from leaching of the spoil aquifer would irretrievably increase salt loads in the project area and its general periphery. The increased TDS concentrations could contribute to regional increases in the Colorado River Basin.

Conclusion

Development would displace, reduce, or possibly eliminate the flows of existing springs in or near the proposed mined area. The replaced spoils aquifer would have different properties and water would be recharged to depth instead of moving laterally along the impermeable perched strata. Groundwater quality would be degraded from the increases in TDS concentrations. Impacts to water rights in the project area and its general periphery could require compensation to the owners. BLM's Preferred Alternative could partially replace the present aquifer conditions, but the amount of flow from the artificially created seep areas and the life-spans of the structures cannot be quantified at this time.

FLOODPLAINS

Affected Environment

BLM regulations require identification of floodplains (based on a 24-hour precipitation event with a 100-

year recurrence interval) on which mining could not be undertaken without substantial threat of loss of life or property (43 CFR 3461.1, 1984).

Using computed peak flows and channel cross-section measurements, estimates of floodplain widths were derived for James Creek and Good Spring Creek. The floodplain boundaries are approximately the same as the boundaries of the unconsolidated stream-laid deposits shown in figure 3-1 (see page 39) in the Alluvial Valley Floors section (CDM 1984a).

The estimated discharge associated with a 100-year event for the James Creek watershed ranges between approximately 558 and 731 cfs (CDM 1984a). The volume of water estimated to flow during the storm is about 290 acre-feet (CDM 1984a).

The estimated discharge associated with a 100-year event for the Good Spring Creek watershed ranges between approximately 1,224 and 1,730 cfs (CDM 1984a). The volume of water estimated to flow during the storm is about 1,367 acre-feet (CDM 1984a).

Environmental Consequences

Impacts

No Action/No Development Alternatives. The James Creek and Good Spring Creek floodplains would be generally unaffected by the current practices associated with undeveloped rangeland management.

Development Alternatives. Without proper flood control measures (prudent planning of loadout facilities and the transportation corridor), a substantial threat to Highway 13/789 and a ranch property located about 3/4 mile downstream from the James Creek and Good Spring Creek confluence could occur.

GEOLOGY AND MINERALS

Physiography

Consol's project area lies on the western edge of the Southern Rocky Mountain physiographic province. The White River Plateau is to the southwest and the eastern Uinta Mountains are west of the project area (Brownfield and Johnson 1980). Locally, the Danforth Hills occupy the northeast rim of the Piceance Basin (Haines 1975).

Altitudes in the project area range from 8,673 feet to less than 6,640 feet (USGS 1966).

The area is characterized by hills with steep, brushy slopes ranging from 15 to 28 degrees and narrow valleys (Haines 1975). Good Spring Creek and its tributary, James Creek, flow northward into Milk Creek and on into the Yampa River, approximately 13 miles north of the Ninemile Gap topographic quadrangle. Drainage in the area appears to have a trellis pattern that would indicate fracture zones or underlying rocks of differing resistance to erosion such as would occur in folded strata.

Coal

Affected Environment

Coal mining in Rio Blanco County has been operating on a small scale since the 1880s, with production geared primarily to supply coal for local needs. Forty-seven mines have been recorded, but this number may not be accurate because of sales and eventual renaming of mines and thus, duplicate records. Recently, near Meeker, the Reinau No. 2 and Northern No. 1 mines were opened, but only the Reinau No. 2 is operating. The Northern No. 1 mine is in the development stage. The Colowyo mine, about 5 miles north of the PRLA in Moffat County, is operating.

See the Economics section of this document and the Federal Coal Program Draft Environmental Impact Statement supplement, February 1985, for details on regional mining and trends.

Structure. Regionally, Sand Wash Basin, extending from southern Wyoming into northwestern Colorado, and Piceance Basin to the south, are separated by the Axial Basin uplift (Brown 1983). The White River Uplift rises out of the Piceance Basin via the Grand Hogback monocline southwest of Meeker (Tweto 1979). Map 3-5 shows regional structural features.

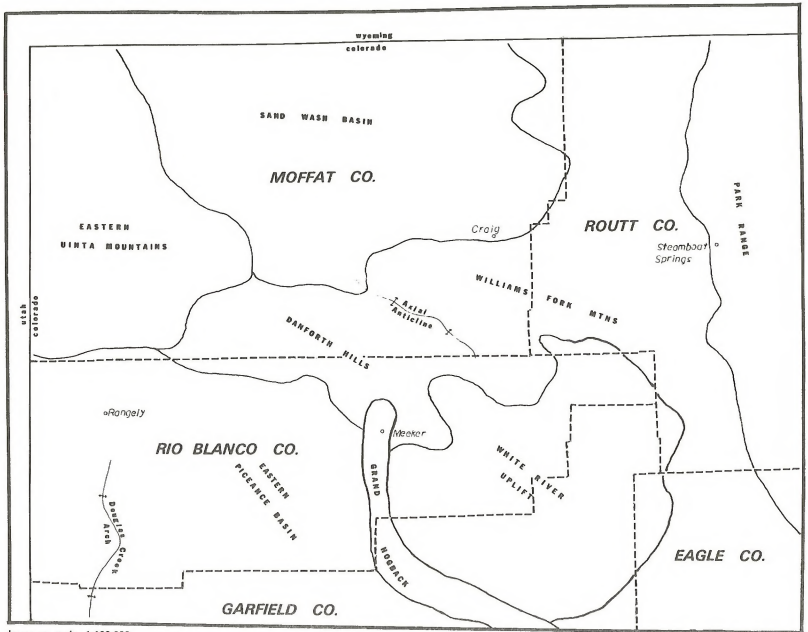
Major structural features in the project area are the Sulfur Creek Syncline, Danforth Hills Anticline, and the Elkhorn Syncline (Haines 1975). Map 3-6 shows these features as demonstrated by structural contours drawn on top of the Trout Creek Sandstone.

Beds in the area dip from 3 1/2 to 20 degrees, averaging 11 1/2 degrees, in a direction ranging from northeast to northwest (Haines 1975).

No significant faulting is known in the immediate project area.

Stratigraphy. The Upper Cretaceous Mesaverde Group is the only major stratigraphic unit to crop out in the project area and to contain the coal deposits of interest. Thus, only the stratigraphy of the Mesaverde Group will be discussed.

The Mesaverde Group is divided into two units: the upper unit is the Williams Fork Formation, and the lower is the Iles Formation. The top of the Iles Formation is considered to be the Trout Creek Sandstone

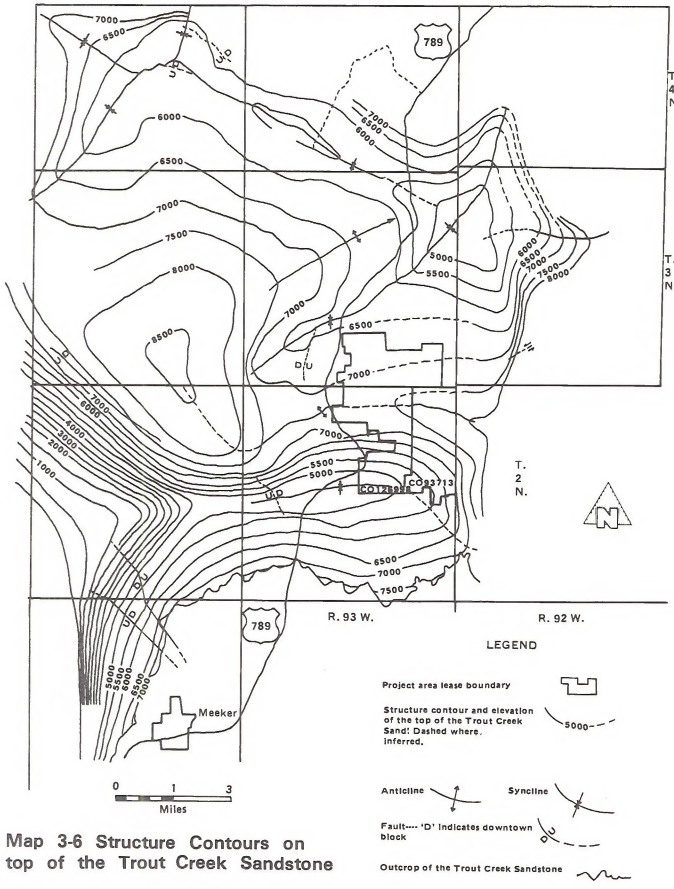


drawn on scale 1:100,000

1 0 1 2 Miles

after Tweto, 1979 & Collins, 1979

Map 3–5 General Regional Structure of Northwest Colorado



Map 3-6 Structure Contours on top of the Trout Creek Sandstone

Member. The Trout Creek Sandstone, a clean white sandstone, averages 180 feet thick and provides a prominent stratigraphic marker and a regionally important aquifer. The coals of interest lie above the Trout Creek. The Iles Formation overlies the Cretaceous Mancos Shale (an oil and gas producing formation in the region) and consists of sandstone, shale, and coal. The coals within the Iles occur in two groups, the Black Diamond coal group and the lower coal group, and have been mined south of the project area. According to Haines (1975), "It is difficult to project these beds, however, into the lands included in these applications owing to the lenticularity of the beds and frequent poor quality of the coals."

The Williams Fork Formation of the Mesaverde Group occurs at the surface throughout much of the project area and has been eroded away in places and consists of sandstone, shale, and the coal beds of interest within the project area (Haines 1975).

The coals within the Williams Fork Formation occur in three groups separated by intervals of "barren" shale and sandstone. The uppermost, the Lion Canyon coal group, is "considered to be eroded from the area of the application land" (Haines 1975). The Goff coal group, about 700 feet thick, lies under the Lion Canyon Sandstone and about 2,300 feet to 3,000 feet above the Trout Creek Sandstone. There is about 1,000 feet between the Goff coal group and Fairfield coal group. The Fairfield coal group, which contains the beds of interest, lies about 1,300 feet above the Trout Creek Sandstone (Haines 1975). Figure 3-1 shows a generalized stratigraphic column of the groups (see page 39).

Correlation of specific coal beds is very difficult in this region due to the lenticularity of the beds. Some seams have been named for the mines they have supported; however, seams cannot be accurately traced very far from that mine.

Coal Reserves. Consol estimates coal reserves within the PRLA and adjacent leases at 1 billion tons. Estimated in-place reserves for the lease application alone are 610 million tons (Haines 1975). Sources disagree on the recoverable reserves. Coal quality in this region is reported to be high volatile C bituminous (Dames and Moore 1979).

Regulatory requirements concerning diligent development and continued operations would have to be met. 43 CFR 3483 regulations can be summarized as requiring that 1 percent of the recoverable reserves be developed within 10 years of the lease issuance or lease readjustment date and each year thereafter. According to the proposed mine plan, 280 million tons of coal are assumed recoverable within the project area. To comply with the continued operations regulations, approximately 2.8 million tons must be produced each year. Advance royalty may be paid in lieu of continued operations, if production requirements are not met during the year. However, advance royalty may be accepted for no more than 10 years.

Environmental Consequences

Impacts

No Action/No Development Alternatives. If Consol did not develop the mine, the leases and PRLA could be developed (if the tract leased competitively at some future date). No other development or leasing is being considered at this time. If and when any other leasing or development is proposed, additional environmental documentation will be prepared, as needed.

The lands currently within the application for a preference right lease could be offered for competitive leasing in a future coal lease sale, and development could occur at that time.

Development Alternatives. Consol has changed its mining proposal in the amended initial showing to avoid surface disturbance of the elk calving areas, potential winter concentration areas and migration routes. These proposed avoidance areas for elk mitigation would preclude development of approximately 100 million tons of coal resources. Inclusion of these lands in the mine plan would increase the recoverable reserve base to approximately 380 million tons, thus increasing the mine life. The 100 million tons precluded in elk avoidance areas could conceivably be mined from the south, if these lands were ever developed, a condition not currently foreseen, or reclamation of the mined PRLA be completed.

The avoidance of elk use areas would preclude 10 years of mining or approximately 100 million tons of coal from development. It would also force relocation of surface facilities and the overburden stockpile from the ridge tops near Ninemile Gap into the James Creek drainage as is described in Consol's current proposal (Chapter 2), which would be less than an optimal layout for the mine operation.

Oil and Gas

Affected Environment

Oil and gas have been produced near Consol's lease area since 1938, from Cretaceous and Jurassic Age formations. These formations are stratigraphically several thousand feet below the Upper Cretaceous beds proposed for coal mining.

Known Geologic Structures. There are two known geologic structures (KGSs) near the project area from which oil and gas are currently being produced.

The Ninemile KGS partially overlaps Consol's coal lease C-093713 that is adjacent to the subject preference right lease application. The KGS was established August 22, 1966 (Witherbee, personal comm. 1985). As of January 1, 1983, the Ninemile field has produced approximately 988,440 barrels of oil from the Lower Cretaceous Dakota Sandstone (State of Colorado 1983).

The Wilson Creek KGS was established December 9, 1938 (Witherbee, personal comm. 1985), about 2 miles west of Consol's project area. The field has produced 57,021,598 barrels of oil and 55,232,857,000 cubic feet of gas from the Jurassic Morrison Formation as of January 1, 1983 (State of Colorado 1983).

Unit Agreements. Two unit agreements exist near Consol's project area. A unit agreement is an agreement between leaseholders concerning the methods by which the oil and gas field will be explored and developed. A unit agreement does not necessarily coincide with a KGS but indicates production or a potential for production.

The Wilson Creek Unit is located approximately ½ mile from Consol's western boundaries.

The McHatton Reservoir Unit partially overlaps Consol's coal leases C-093713 and C-093716. Cumulative production to date is 2,900 barrels of oil from the Niobrara equivalent interval of the Upper Cretaceous Mancos Shale (State of Colorado 1983).

Existing Leases and Wells. Of the 32 oil and gas leases within Consol's project area, 21 are on the preference right lease application.

Petroleum Information Corporation reports two dry and abandoned wells within the boundaries of preference right lease application C-0126998.

Environmental Consequences

Impacts

No Action/No Development Alternatives. If Consol's project area were not developed for coal, the oil and gas leases could be developed without constraints from coal development.

Development Alternatives. The potential exists for conflicts between simultaneous coal and oil and gas development regarding surface occupation. There would be no impact to the oil and gas reservoirs from mining because the oil and gas horizons are considerably below the 800 feet maximum pit depth Consol proposed.

Conclusion. Oil and gas leases should not significantly conflict with coal development, as long as coal and oil and gas lessees sign agreements prior to mining.

Other Minerals

Affected Environment

No leaseable minerals other than oil, gas, and coal are known to exist in significant quantities within the project area (BLM 1982). A record search revealed no mining claims on lands included in the PRLA C-0126998.

No salable materials, such as sand and gravel or scoria, have been sold or permitted for use by BLM (Beckett, personal comm. 1985). Scoria is known to exist in the area; however, the amount and development potential is unknown.

Environmental Consequences

Impacts

No Action/No Development Alternatives. No impacts are anticipated.

Development Alternatives. Since no significant quantities of locatable or leaseable minerals are known other than coal, oil, and gas, coal mining would have an insignificant impact on these minerals.

Development of salable materials could be precluded by coal mining. Salable materials could be developed within the project area prior to and during mining.

Conclusion. No significant impacts are anticipated on locatable or other leaseable minerals under any alternative. If salable materials were developed prior to and during mining, only that material intermixed with the overburden would be irretrievably lost.

Geologic Hazards

Affected Environment

Landslides of various types are common in the Danforth Hills. Colton, et al. (1975), show landslide deposits in all of the major stream valleys within Consol's project area as of 1975. Heavy snowmelt in the spring of 1984 caused extensive landsliding in the Danforth Hills and recent landslides have been sighted within the project area (Beckett, personal comm. 1985).

Rapid earthflow-type landslides frequently occur on north-facing slopes throughout the project area. The debris consists of partially decomposed shale, siltstone, coal, and sandstone that occurs as a mantle over the slope.

Piping, a form of underground erosion, has been observed in the alluvium of James Creek's upper reaches. The alluvium consists of unconsolidated silt, shale, and clay. The piping occurs along the portions of the channel that have been influenced by beaver dams. The piping is probably initiated when the dams are breached and the alluvium is dewatered as the ponds drain. Several sinkholes have been observed as a result of piping, with dimensions ranging from approximately 10 inches to 4 feet in diameter and 1 to 3 feet in depth. Piping and the associated sinkholes make the valley bottom of James Creek a very unstable surface for road construction and heavy truck traffic.

The narrow stream valleys in the area present the potential danger of flash floods (Haines 1975).

Environmental Consequences

Impacts

No Action/No Development Alternatives. No impacts would occur.

Development Alternatives. During initial development and reclamation, landslides could endanger the mine operation. With proper design of moving and reclamation techniques, long-term soil stability would be achievable.

Spring snowmelt provides the lubricant for unconsolidated sediments to become unstable. The unconsolidated sediments are generally stable in a dry state.

Conclusion. Significant geologic hazards within the project area could be mitigated by prudent planning and construction.

PALEONTOLOGICAL RESOURCES

Affected Environment

Two paleontological studies have been conducted near Consol's project area: 1) Townships 3 and 4 North, done in 1983 by Mariah Associates; 2) Piceance Basin south of Meeker, done by Lucas and Kihm (1982). Both studies considered the discovery of vertebrate fossils in the Williams Fork Formation to be of significant scientific value because of their rare occurrence.

Marine, freshwater, and brackish water invertebrates are frequently found in the Williams Fork Formation, along with occasional plant and vertebrate fossils (Mariah Associates 1983).

Dinosaurs existed during the time of deposition of the Williams Fork Formation, as evidenced by their tracks and fragmentary pieces of bone (Brown 1983). Full or even partial skeletal remains are rare (Mariah Associates 1983).

Since vertebrate fossils were found in the Williams Fork Formation, such fossils could be present in Consol's project area.

Environmental Consequences

Impacts

No Action/No Development Alternatives. No development in the project area would prevent degradation of paleontological resources. However, potentially significant fossils would probably not be discovered.

Consol's Proposed Action. Development of coal by surface methods presents a likelihood that undiscovered fossils within the overburden and interburden would be destroyed. Therefore, the historical and biological information that could be gained from their study would be lost. However, development of coal also increases the chances of discovery of scientifically important fossils. Once discovered, these fossils could be protected.

BLM's Preferred Alternative. Under the preferred alternative, there would be no significant impacts after mitigation.

Conclusion

No significant fossils are known in the project area. However, a potential for discovery of such fossils exists.

VEGETATION

Affected Environment

Vegetative communities in the project area include big sagebrush shrubland, mixed mountain shrubland, and aspen woodland. The communities comprise 96 percent of the area. Mountain grassland, wetlands, meadows, and agricultural land comprise 4 percent (table 3-10).

Environmental Consequences

Impacts

No Action/No Development Alternatives. Under these alternatives vegetation would not be disturbed by mining.

Development Alternatives. Up to a total of 5,200 acres of vegetation would be disturbed. Of this, only a maximum of 818 acres would be disturbed at any one time. Reclamation would follow on areas as the mine pit moved. Approximately 375 acres, to be used for

TABLE 3-10
VEGETATIVE DESCRIPTIONS[a]

Community	*Acres*	*Elevation*	*Slope*	*Dominant Plants*	*Percentage Cover*	*Other Plants*	*Soil Type*	*Productivity (lbs/acre)*
Big Sagebrush Shrubland	694	7200′ to 7800′	5-35%	Big sagebrush	40 overstory, 50 herbaceous	Kentucky Bluegrass, Columbia needlegrass, Junegrass, mule's ear	Owen Creek-Jerry-Burnette loams	1,328[b]
Mixed Mountain Shrubland	3,590	7600′ to 8400′	8-65%	Utah serviceberry, Gambel oak	50 overstory, 60 herbaceous	Variety of grasses and forbs	Jerry-Thornburg-Rhone	926[b]
Aspen Woodland	601	7300′ to 8600′	3-50%	Aspen	50 overstory, 50 to 80 overstory, 80 overstory	Chokecherry, various forbs and grasses	Rhone, Northwater	2,250[c]
Mountain Grassland	58	8200′ to 8600′	3-50%		50 herbaceous	Beardless wheatgrass, Junegrass, bluebunch wheatgrass, longleaf squirreltail	Waybe-Vandamore, Variant-Rock outcrop complex	350[c]
Wetlands	84	7000′ to 7600′	0-5%	Willows	10 open water, 20 overstory, 70 herbaceous	Cattail, Nebraska sedge, field cluster beaked sedge, hair grass, foxtail barley spike rush, baltic bush	Owen Creek-Jerry-Burnett loams	
Meadows	94	7000′ to 7600′	0-5%		100%	Wildrye, spinnery Canadathistle, cutleaf cuneflower, stinging nettle, lupine, yarrow; or bluegrass, asters, dandelions, tarweed cinquefoil, sage	Owen Creek-Jerry-Burnette loams	2,707[b]

[a] CDM 1984a [b]OSM 1982 [c]SCS 1982

ancillary facilities, would remain disturbed for the mine's life. Loss of the vegetation is considered mitigatable and not significant. Another loss could occur from building a rail line up Good Spring Creek (outside the PRLA) and the attendant loss of approximately 152 acres of wetland meadows. Of this acreage, 100 acres are used for hay production. No mitigation has been proposed at this time for the rail line, because no proposal to build it has been received, and no permit for construction is under consideration.

Approximately 10 acres of agricultural land would also be lost at the loadout facility. This is considered mitigatable and not significant.

Direct impacts to vegetation in the wetlands and meadows would be insignificant; however, the resultant impacts to livestock and wildlife could be significant (see Livestock and Wildlife sections). During mine operations, about 28 acres, or 24 percent of the wetlands and meadows in James Creek, could be lost through haul road construction. Additional acres could be lost as a result of silt from the road. The most significant action would be the mining of the headwaters of James Creek. The alteration of the Williams Fork aquifer system at the headwaters could result in the loss of significant portions of the wetland-riparian complex (see Groundwater section). The functional attributes of the riparian ecosystem would not be operational. Through time, riparian vegetation would be replaced by upland species such as sagebrush, rabbitbrush, and annuals. Mitigation of these impacts would depend on replacement of the water sources (see Groundwater section) and Consol's commitment to reestablish wetlands (Appendix C).

There would be no impacts to threatened, endangered, candidate, or sensitive plant species.

Conclusion

Although the impacts to vegetation would not be significant when considered alone, impacts to wildlife and livestock, resulting from loss of habitat and forage, could be significant (see Elk section).

WILDLIFE

Elk

Affected Environment

Baseline studies (CDM 1984c, CDM 1985) confirm that elk calve, winter, and migrate through the project area. Patterns of seasonal elk use overlap the project area and adjacent Federal coal leases held by Consol (map 3-7). See Appendix D for vegetative types.

Calving Habitat. Baseline studies conducted by CDM during the 1983, 1984, and 1985 calving seasons demonstrated that the project area is a portion of one of three discrete calving/rearing areas (see map 3-8). The areas are satellites on the western edge of calving habitat, which are used by the main White River elk herd, that extend east from Yellow Jacket Pass to Lost Park. The three calving areas are linked to cover provided by higher elevations that are exposed to cooling winds and to aspen stands that provide escape from summer heat. Other characteristics contributing to the area's suitability include perennial water and availability of salt from livestock operations.

Little evidence exists that a given cow elk selects the same calving site year after year. There is, however, considerable evidence that cows will return to the same area for calving each year. Athough baseline studies by CDM suggest that it is not regionally unique, removal of the calving habitat within the PRLA and vicinity could cause a calving disturbance or displacement of up to 3 percent of the White River elk herd in Game Management Units 12, 23, and 24 as shown in map 3-9. This could affect up to 300 animals.

Winter Ranges. Baseline studies (CDM 1984b) indicate that although the greatest concentrations of wintering elk occurred at elevations below 7,000 feet in Axial Basin and White River Valley during the winter of 1983-1984, no large concentrations of elk were detected within boundaries of the project area. During the winter of 1983-84, the majority of the project area was not available as winter range because of heavy snow cover. This was an extremely severe winter and is not indicative of a normal winter. Densities of elk recorded in the project area during intensive helicopter surveys, completed between December 1983 and April 1984, ranged between 1.1 and 3.9 elk per square mile (CDM 1984b). Elk were concentrated on south- or west-facing mountain shrub slopes with less snow. The overlap of agriculture with elk wintering areas in Axial and White River basins indicated the importance of maintaining higher elevation winter ranges that could be used more intensively during open winters.

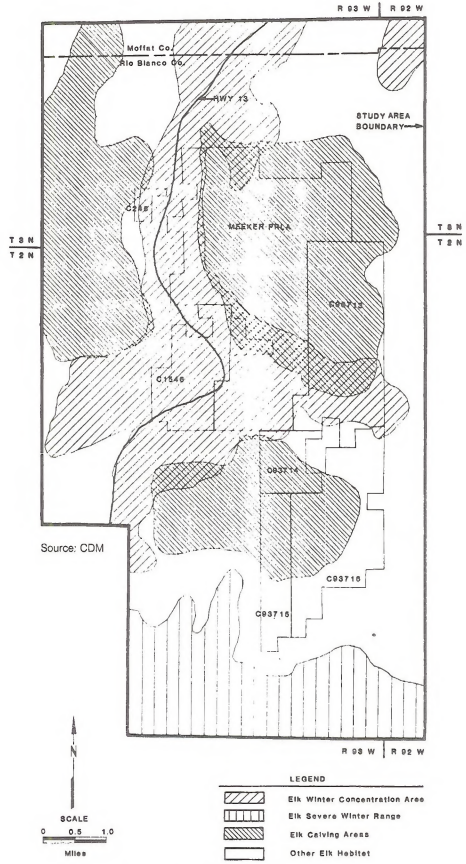
Radiotelemetry studies during the 1984-85 winter suggest a low fidelity to winter range by those elk that were monitored (CDM 1985). The fairly extensive elk movement exhibited during the separate and combined hunting season may preclude any fidelity to a specific winter range. A 28-percent mortality of radio-collared elk may indicate a larger hunting-related mortality than was originally thought, or this may indicate that many elk are moved into unfamiliar territory by hunting season pressure.

Many studies suggest that availability of quality winter range is the limiting factor controlling big game populations in northwest Colorado. CDM (1984b) identified the quality of transitional range (late fall-early winter, late winter-early spring) as a determinant of big game productivity, as documented by Verme (1969), Thorne et al. (1976), and Mautz (1978). Elk densities recorded during April 1983 (20 elk per square mile) and May 1983 (11 elk per square mile) suggested that the south-facing slope above Ninemile Draw was an important late winter/transitional range area (CDM 1984b). This baseline study and CDM's literature review indicate that maintenance and replacement of winter and transitional ranges within the project area are important to successful mitigation. BLM considers the entire oakbrush-serviceberry ecosystem within the project area to be important transitional range.

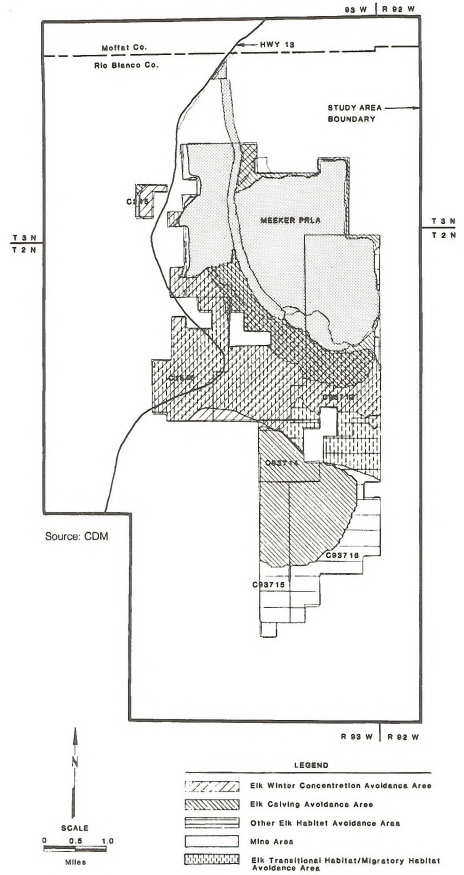
Migratory Routes. The CDM (1984b) baseline study in the vicinity of the PRLA suggest that movement from winter range to calving and summer ranges occurs as an elevational drift rather than as a movement through distinct corridors. Relocations of radio-collared elk showed several paths of movement through areas of minimal topographic resistance as potential migration routes of White River and Williams Fork elk.

Radiotelemetry results suggested that most elk wintering in the vicinity of the Meeker PRLA were migratory elk from the White River herd. Based on movements from winter range to calving and summer ranges, it appears that Ninemile Draw serves as one of many routes that the elk use to reach the Coal Creek, Milk Creek, and Lost Park calving, rearing, and summer ranges.

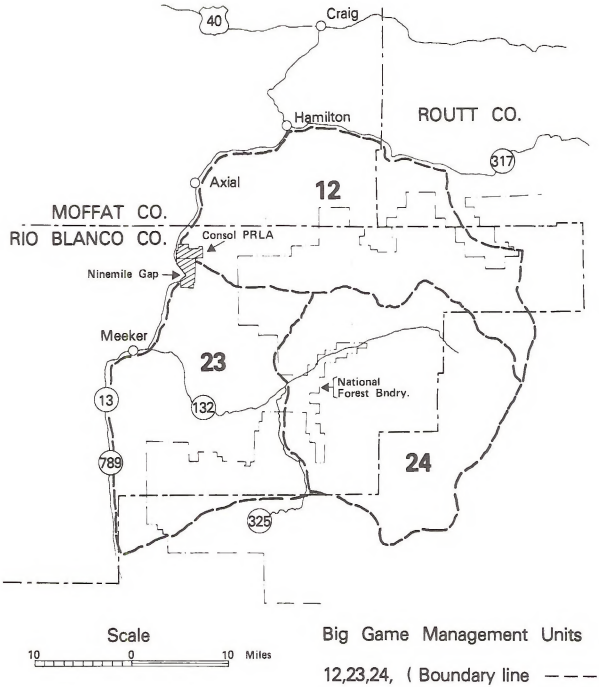
Although some elk trapped at the project area during winter moved across State Highway 13 to winter and summer ranges in the west fork of Good Spring Creek and Hole-in-the-Wall, no evidence was found in 1983 and 1984 that Ninemile Draw is a major migratory route connecting winter ranges west of State Highway 13 and summer ranges on the White River during the study years (CDM 1984b).



Map 3-7 Patterns of Seasonal Elk Use



Map 3-8 Elk Calving Area



Map 3-9 Big Game Management Areas

Radiotelemetry results during the 1984/85 winter throughout the region reinforce the suggestion that the Ninemile Draw/PRLA area is within one of several extensive migratory routes used by White River/Williams Fork elk. Comparison of 1984/1985 fall/winter movements of radio-collared elk indicates that many elk trapped in the Ninemile Draw/James Creek vicinity migrated via other routes to winter ranges remote from their 1983/1984 trapsite (CDM 1985).

The fairly extensive elk movement exhibited during the separate and combined hunting season may preclude any fidelity to a specific migration route, as well as a winter range.

Skovlin (1982) concluded that the theory that elk repeatedly use the same migratory routes was well accepted by elk researchers and, based on the observations of Murie (1951), that this behavior is passed from cow to calf. However, little direct evidence supports the theory, and elk responses to migratory routes probably depend on terrain characteristics (CDM 1984b).

Radiotelemetry results (CDM 1984b) suggest that although the magnitude of movement through Ninemile Draw is not quantifiable, this area serves as a topographic funnel through which elk will move readily.

Use of Ninemile Draw as transitional range, as observed during April and May 1983, reinforces this conclusion. Elk movement between the Coal Creek Road and State Highway 13 was identified as a pattern that must be maintained to achieve successful mitigation of mining impacts. Again, elk behavioral response was regarded as the key to assessing impacts of mining and prescribing successful mitigation (CDM 1984b).

Environmental Consequences

Impacts

No Action/No Development Alternatives. No significant impact would be anticipated under these alternatives. The portion of the White River elk herd using the PRLA for calving would be undisturbed. Migration routes and winter use areas would also be unaffected.

Development Alternatives. During the projected 30-year life of the mine, vegetation would be removed from approximately 5,200 acres. Approximately 73 percent of this area is dominated by mountain shrub, which is comprised of serviceberry, snowberry, Gambel oak, and sagebrush. Aspen stands are found on approximately 22 percent of the project area. Removal of this mountain shrub community would displace elk to adjacent browse areas. This might result in overutilization of some off-site use areas.

Approximately 75 percent of the PRLA (not the project area, but just the PRLA) is used by 65-100 elk for calving. The elk displaced by mining would be forced to move to adjoining calving areas on and off the project area. It is not known if the elk already using the adjoining calving areas have achieved maximum threshold densities, and although they probably have not, the possibility exists. Threshold numbers in this case refer to the maximum numbers of animals that a particular habitat can support. If adjoining habitats were saturated, they could not accommodate additional cow/calf pairs, and elk would be displaced to lesser quality habitats. Roughly 25 percent of the project area is a elk winter concentration area. The beginning of mine activity could force the elk onto adjoining winter areas that would, in turn, apply more pressure to these undisturbed areas.

If the quantity and quality of water in James Creek were lost or greatly decreased, the project area would probably become much less desirable for calving and rearing during the spring and summer (see the Surface Water section).

During mining at the project's south end, it is not known what disruption might occur during the spring-fall migration. Elk could be forced to avoid the disturbed areas and be driven onto new winter areas.

Although off-site areas would be enhanced, no additional acreage for calving would be created by enhancement. The end result would be a net loss of space on which to calve or survive the winter. The development alternative would disrupt elk calving areas, migration routes, and water sources. Forage could also be lost. However, if enhanced, the off-site areas might support more animals per unit.

Conclusion. The off-site enhancement of winter/transitional range and calving areas proposed by Consol would satisfy the short-term mitigation requirements. Although no areas or acreages have been determined, Consol would be willing to develop/enhance areas so that elk are scattered, and they do not overuse the enhanced areas. The total area treated would be approximately the same as that disturbed by mining activities.

Between short-term off-site enhancement and the proposed long-term reclamation, both of which Consol has committed to, there would be minimal impact on the wintering or calving capability of the White River elk herd.

Mule Deer

Affected Environment

The project area is classified as summer range and is vital to deer. Deer's condition (amount of body fat) at the beginning of winter depends on the condition and productivity of the summer range. Aspen stands, which exist on 1,150 acres and comprise 22 percent of the project area, are an important component of summer range.

Mule deer are the most abundant large mammal within the lease area during the spring, summer, and fall. According to the Colorado Division of Wildlife 1041 Data, seasonal population and range estimates, the area is primarily summer range, with a density of 21 deer per square mile. Deer also use the James Creek area extensively during spring/fall movements. Maximum numbers occur in April and October when population densities may exceed 50 deer per square mile. Fawning occurs on these lands, but no discrete locations have been identified.

Winter snow accumulation restricts deer to south-, west-, and east-facing slopes at lower elevations. During the winter of 1983-1984, wintering mule deer in the PRLA study area were limited to east- and west-facing slopes above the Good Spring Creek valley bottom, sagebrush shrublands in the Elkhorn Creek drainage, and east-facing sagebrush and juniper-pinyon woodland near the Elkhorn Creek-Milk Creek confluence. Aerial surveys indicated that deer were distributed in the juniper-pinyon woodland, sagebrush shrubland, and agricultural habitat types. Deer densities were highest in the south-facing canyons and slopes of the cliffs bordering the White River Valley to the south and in the Axial Basin north of the PRLA (CDM 1984a).

Environmental Consequences

Impacts

No Action/No Development Alternatives. These alternatives would cause no significant impact. The acreage within the project area would remain undisturbed and would continue to be used as summer range, fawning areas, and migration routes.

Development Alternatives. The production of 10 million tons per year would encroach on a vegetative complex that is vital to the yearlong well being of mule deer. Summer use is attributed to perennial water found in James Creek. At the beginning of mine operations, the headwaters of James Creek would be disturbed (see the Environmental Consequences section for elk). Disturbing the headwaters and eliminating or reducing the quality or quantity of the water supply could seriously damage the project area's summer range capacity.

Elimination of the mountain browse and aspen groves would cause dispersal to adjoining areas. This dispersal during the summer would remove approximately 21 deer per square mile from the areas of mine activity. As a result, two things could happen: (1) The 21 deer per square mile could move onto adjoining areas in the project area, thereby increasing the density of animals and competition for available forage; or (2) deer could move onto other areas outside the project area boundaries, resulting in an increase in animal density and competition for forage.

During the fall migration, mule deer might avoid areas compacted by surface mining activities and thereby alter their distribution among areas used traditionally as winter range. During spring and fall migration periods, an excess of 50 deer per square mile use the project area and similar adjacent areas.

Deer densities were taken from the final EA (USDI 1979) and these figures were derived from CDOW's 1041 data.

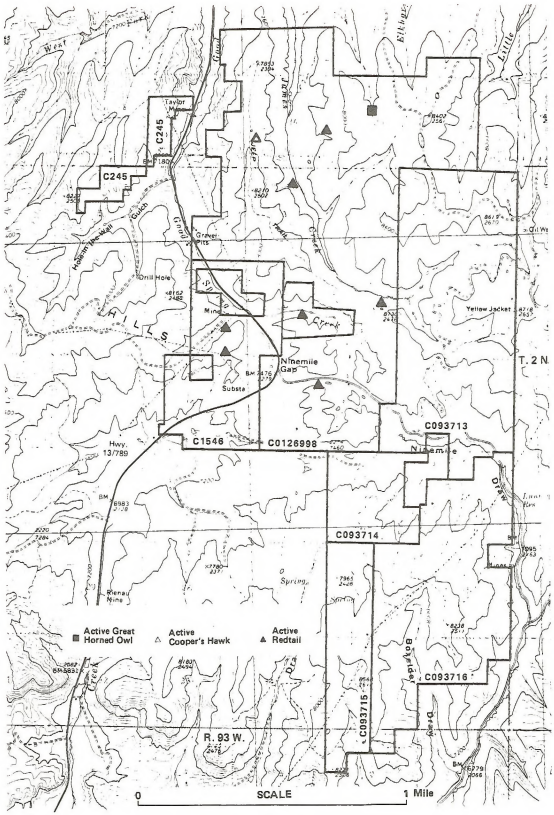
Conclusion. If food and cover were removed during mining, animals would be forced onto adjacent areas. This would increase competition for available forage. If James Creek's flow were disrupted, the area would become less effective for summer range. Mine workings would disrupt fall migration routes, resulting in less use of traditional winter use areas or causing deer to use new areas.

Between short-term off-site enhancement and the proposed long-term reclamation, both of which Consol has committed to, there would be very little impact on the deer population's wintering or fawning capability.

Raptors

Affected Environment

Nine species of raptors were observed during CDM's field surveys of the project area and adjacent leases in 1984. Most common were red-tailed hawk and turkey vulture. Red-tailed hawks were observed primarily in mountain shrubland and aspen habitats; turkey vultures were found throughout the project area. Species less frequently found were Cooper's hawk, northern harrier, great horned owl, American kestrel, golden eagle, Swainson's hawk, and prairie falcon. Raptor nesting appeared to be concentrated in aspen groves. Virtually all wildlife habitats were used as hunting grounds.



Map 3-10 Raptor Nests

Aerial and follow-up ground surveys of the project area for active raptor nests showed 13 red-tailed hawk nests, one Cooper's hawk nest, and one great horned owl nest (map 3-10). All nests were in aspen or oakbrush stands. Brood counts of the red-tailed hawk nests showed one or two young per nest. The surveys revealed no cliff nests in the PRLA.

Nine active red-tailed hawk nests were observed on the adjacent Federal leases. One red-tailed hawk nest and one great-horned owl nest, which were noted as active during April 1984 aerial surveys, have apparently been destroyed by a mudslide.

Twenty-three nests, which were unattended, inactive, or unidentified, were listed as unknown on map 3-8.

However, two active Cooper's hawk nests, two additional active accipiter nests, one active falcon scrape, one active prairie falcon nest, and two great horned owl fledglings were observed in sections 24, 25, and 35, located east of leases C-093714 and C-093715. Active and inactive golden eagle nests were recorded in the cliff habitat south and west of lease C-093715. Several additional active red-tailed hawk nests were seen in the 1-mile buffer zone around the project area and lease tracts. A vulture roost exists in section 12 of C-093713 (CDM, 1984a).

Environmental Consequences

Impacts

No Action/No Development Alternatives. Under these alternatives, the 13 red-tailed hawk nests, one Cooper's hawk nest, and one great horned owl nest would remain undisturbed. It is not known what species, if any, inhabit the 23 nests listed as unknown, but they would also remain undisturbed.

Consol's Proposed Action. The 13 red-tailed hawk nests (which were active during the spring of 1984), one Cooper's hawk nest, one great-horned owl nest, and the 23 nests listed as unknown would be disturbed. Each site mined would become unavailable to the species using the site and the species would be forced to relocate. If the species relocated off the project area, no further disturbance would occur. However, if the species relocated their nest sites to suitable habitat within the unmined project area, relocation would again be necessary when mining started in that area.

BLM's Preferred Alternative. Under this preferred alternative, no significant impacts are anticipated because of the mitigation that will have to be developed in consultation with USFWS and CDOW.

Conclusion. Surface disturbance would eliminate nesting habitat for the raptors using the disturbed area. This area would be unavailable for nesting until adequate nesting habitat has been replaced. This should not significantly affect regional raptor populations.

Game Birds and Waterfowl

Affected Environment

CDM (1984a) reports game birds, including blue grouse, sage grouse, and mourning dove, occur in the area. Many species of waterfowl may occur in the project area and vicinity as residents, breeders, winter visitors, or migrants.

Blue grouse and mourning dove were the most frequently observed gamebirds. Blue grouse were commonly found in mountain shrubland habitats; mourning doves were more widely distributed. Although not observed, sharptailed grouse may also occur in mixed shrub habitats of the area, but in relatively low numbers (BLM 1983).

Within the project area, territorial male blue grouse and hens with broods inhabit shrubland south of James Creek (sections 3, 10, and 11), and north of Ninemile Draw (section 14).

No sage grouse leks were observed on the tracts; however, one lek is located approximately 3 miles north of the PRLA in section 12.

In addition, flocks of two to four sage grouse were sighted in the sagebrush shrublands in the northern portion of lease C-093713 during summer 1983 and spring 1984. These flocks may be composed of individuals that used the lek north of the project area (section 12) and then moved to higher elevation shrubland habitats that offer superior forage and cover. CDOW density estimates for sage and blue grouse in game management Unit 12, of which the PRLA is a part, are 13 to 21 sage grouse and five blue grouse per square mile (McKean and Trindle 1976).

Waterfowl species observed by CDM personnel during field surveys include mallard, green-winged teal, northern pintail, cinnamon teal, northern shoveler, American wigeon, ring-necked duck, lesser scaup, and American coot. Mallard, cinnamon teal, and ring-necked duck were by far the most abundant. Mainly individual sightings were noted in the area. Almost all these were in aquatic areas or associated wetland vegetation.

Broods were observed in June and July in various ponds of the southern portion of the project area and vicinity. None were seen in the James Creek drainage during 1984, possibly because of the loss of suitable habitat from flooding and mudslides. Mallards were

most frequently observed with young, in broods ranging from two to 14. Other species, with broods from two to nine, included green-winged teal, ring-necked duck, American wigeon, and cinnamon teal. Broods of mallard, cinnamon teal, and green-winged teal were recorded in the vicinity of the project area by Northern Coal in 1982 and P & M Coal Mining Co. in 1981 (CDM 1984a).

Environmental Consequences

Impacts

No Action/No Development Alternatives. Under these alternatives, the waterfowl and game birds would not be disturbed.

Development Alternatives. Game birds would be forced to use other areas within and adjacent to the project area during mining. Disturbance or destruction of water sources would also force game birds to relocate. Providing new water sources during reclamation would provide for spring waterfowl use of the area. Sage grouse would also benefit from reclamation efforts, especially if preferred forb species were included in the seed mix.

Blue grouse habitat and blue grouse would be eliminated by mining disturbance until mountain shrub and aspen groves could be replaced. Mourning dove would be the primary beneficiary of the early reclamation effort.

Conclusion. Possible elimination of portions of James Creek as a perennial water source could make a major portion of the project area less desirable for game birds and waterfowl; however, mitigation by Consol would alleviate this problem. There would be no significant impacts to regional populations.

Beaver

Affected Environment

James Creek is one of the principal habitats for beaver in the project area. During spring 1984 surveys, beaver activity was limited to the uppermost reaches of James Creek, a tributary of Good Spring Creek. One or two lodges appeared to be maintained in each of the activity areas. Evidence along James Creek showed that the unusual amount of spring 1984 runoff and mudslides contributed to siltation of ponds and breeching of dams. Beaver abandoned some areas.

Beaver mortality from recent flooding is unknown. However, a follow-up survey of the creek in summer 1984, after the spring runoff, indicated that beaver activity was minimal and confined to sites where beaver dam and lodges remained intact. Approximately 40 active beaver ponds were observed during this study (CDM 1984a).

The prevalence of older cuttings and dams in the valley supports Madison's observation (1984) that a larger population of beaver inhabited the James Creek drainage within the last decade. About 5 or 6 years ago, an epizootic plague (perhaps tularemia) decimated the population. Some of the dams along the creek have since fallen into disrepair and have been breeched (Madison 1984) (CDM 1984a).

Colorado Division of Wildlife's (1976) mapping in Rio Blanco County shows that beaver occupy most drainages. The location and degree of recent beaver activity in James Creek drainage from April to July 1984 suggest approximately 8.1 individuals per square mile for inhabited areas.

Environmental Consequences

Impacts

No Action/No Development Alternatives. Under these alternatives, the beaver population would not be affected.

Consol's Proposed Action. Mining and reducing the quantity of water flowing in James Creek through the project area could cause the beaver to move to more available water. If the creek flow were not restored at the end of mining activities, the beaver population would probably never be replaced. Beaver would maintain water control structures and would eliminate the need for man-made structures.

Allowing the haul road to parallel the creek channel would reduce the attractiveness of James Creek to beaver.

BLM's Preferred Alternative. Under the preferred alternative, there would be no significant impact because the creek channel would be protected from disturbance, or disturbance would be mitigated.

Conclusion. Any reduction in flow or degradation of James Creek would probably reduce or eliminate its beaver population. This would not be a significant regional impact. However, maintenance of water control structures by beaver might be preferred to the more costly efforts of man and might prove to be valuable for this reason, if protected.

Fish

Affected Environment

Local beaver ponds and James Creek can support several species of game and nongame fish (Madison

1984). A few species of chub and small suckers may occur in James Creek, and channel catfish occur in Lunney Reservoir. From 1980 to 1983, CDOW stocked the beaver ponds in the James Creek drainage with brook trout. However, the CDOW discontinued stocking in 1984 because of the spring 1984 flooding and poor condition of the beaver ponds. It is unlikely that any species of game fish exist in area ponds or in James Creek. Cattle and sheep grazing adjacent to the creek has reduced water quality, making survival of the cutthroat trout in the drainage doubtful.

Most streams and ponds in the project area and vicinity are insignificant fisheries. No threatened and endangered fish species are known to exist in the project area.

Environmental Consequences

Impacts

No Action/No Development Alternatives. Fish would not be affected under these alternatives.

Development Alternatives. Lower water quality and quanity would render fish habitat unsuitable.

Conclusion. Lowering of water quantity or quality would make James Creek unsuitable for fish. This would not be a significant impact because no major populations are known to exist.

Threatened and Endangered Species

Affected Environment

Threatened and endangered species in the general area include the federally listed bald eagle, black-footed ferret, peregrine falcon, and whooping crane. However, neither black-footed ferrets nor white-tailed prairie dogs, their principal prey, have been observed in the project area. The closest prairie dog colonies occur several miles northwest of the PRLA and would not be impacted by the proposed development. The area impacted is not suitable prairie dog habitat.

The peregrine falcon does not nest or hunt in the project area (CDOW 1978). However, one falcon was sighted during the summers of 1974 and 1975 near Mount Streeter, located several miles northwest of the project area (BLM 1976). No falcons were observed in the project area and vicinity during 1984 aerial and ground surveys (CDM 1984a).

Bald eagles are commonly observed during the winter in riparian habitats along the White River. Although bald eagles have not been observed hunting or nesting in the project area, they occasionally hunt near Rattlesnake Mesa, south of the project area, and regularly feed in the Milk Creek drainage northwest of the project area.

The lower Milk Creek drainage is considered a winter concentration area and has been identified in the White River Management Framework Plan, Coal Amendment, 1981, as unsuitable for surface occupancy.

The project area lies within the migration corridor of the federally endangered whooping crane and state-endangered greater sandhill crane. Since key staging areas for these species are found along large rivers where small grain crops are available as food (CDOW 1978), the occurrence of sandhill or whooping cranes near the project area is unlikely. Individuals observed in the area are likely to be migrants (Hollowed, personal comm. 1984) (CDM 1984a).

Environmental Consequences

Impacts

All Alternatives. No known threatened or endangered species are found within or adjacent to the project area. Therefore, no such species would be affected by any of the alternatives.

LIVESTOCK GRAZING AND OTHER LAND USES

Grazing

Affected Environment

Land within the project area is used primarily for range and agriculture (table 3-11). Along with 5,081 acres of rangeland, 15 acres of nonirrigated pasture occur on the Jensen property, which are not considered to be prime farmland.

Part of one Federal grazing allotment is in the project area. There are 4,774 acres in this allotment, of which 4,200 acres are private and 574 acres are lands administered by BLM. The allotment is grazed from June through October by 2,500 head of sheep. There

TABLE 3-11
ACREAGES OF LAND-USE TYPES WITHIN THE MEEKER PRLA

Land Use	*Acres*	*Percentage of Total*
Rangeland	5,081	99.6
Agricultural	15	0.3
Residential (residence not occupied)	3	0.1
Total	5,099	100.0

Source: CDM (1984a)

TABLE 3-12
APPROXIMATE ACREAGES OF LANDOWNERSHIP WITHIN THE PRLA

Owner	*Acres*
BLM	560
Harry Kourlis	2,269
Division of Wildlife	2,250
Jensen	20
Total	5,099

are approximately 2,350 AUMs on the allotment, 164 of which are Federal.

Non-Federal surface lands within the PRLA boundaries are owned by Harry Kourlis, the Jensens, and the Division of Wildlife, as shown in table 3-12 and map 3-11. Land use types are shown on table 3-11.

Rights-of-Way, Leases, and Surface Landowners

Landownership is displayed in map 3-11. No rights-of-way occur on Federal surface within the PRLA (map 3-12). Approximately 21 Federal oil and gas leases exist on or adjacent to the PRLA.

Approximately 85 percent of the PRLA surface estate is nonfederally owned. State Highway 13/789 passes through the southwest portion of the PRLA, and the Rio Blanco County (RBC) Road 30 passes through the southern end of the tract. White River Electric Association's 7.2 kV powerline (C-0112683) parallels State Highway 13/789, with a smaller powerline connecting the residence along RBC 30.

Because the rights-of-way are outside the area currently proposed for mining, no conflicts are anticipated.

The only state or local land-use plan in this area is the Rio Blanco County Master Plan, which was completed in September 1976 and revised April 14, 1983. Nothing in this EIS conflicts with that plan.

Environmental Consequences

Impacts

No Action/No Development Alternatives. No significant impacts would occur under these alternatives.

Development Alternatives. Both of the development alternatives would significantly affect forage and water for livestock. Forage losses should not be significant until the 23rd year of mine operation. From the 23rd through the 30th years of operation, half of the forage in the allotment (2,350 AUMs) would be unavailable. Although reclamation would restore this allotment to its present productivity, any losses of forage during the mine life would be irretrievable and significant to the permittee.

There are 124 AUMs on 100 acres in the James Creek riparian area. It is important to the livestock operator as lambing grounds, as transition range during stockdrives, as summer forage, and as emergency forage and water during drought years. Most of the value of the allotment to the livestock operator would be lost under Consol's proposal. Although Consol would obtain surface rights to the private land and compensate the livestock operator, it is not known whether other suitable land could be found for the livestock operator or whether compensation would offset future losses in revenue. Unless the riparian area could be restored, this land might lose much of its value to future livestock operations.

The decrease in both water quality and quantity and forage production areas in the James Creek drainage would be significant. This decrease would result from the transportation corridor along James Creek and the mining of perched aquifers. These changes might be permanent because mitigation would be difficult.

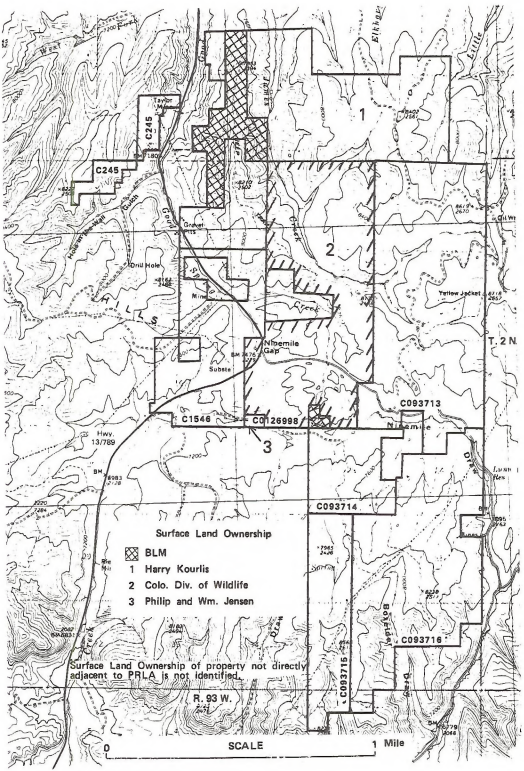
Under all other alternatives, existing rights-of-ways, structures, and mineral leases would conflict with PRLA development. Potential conflicts would be resolved through facility relocation, rights-of-way relocation, and landowner consent.

Conclusion. Important livestock forage and water would be lost if development occurred. Other uses such as lambing grounds, transition range during stockdrives, and emergency forage and water during drought years would be lost. The impacts would be significant to the operation on the allotment.

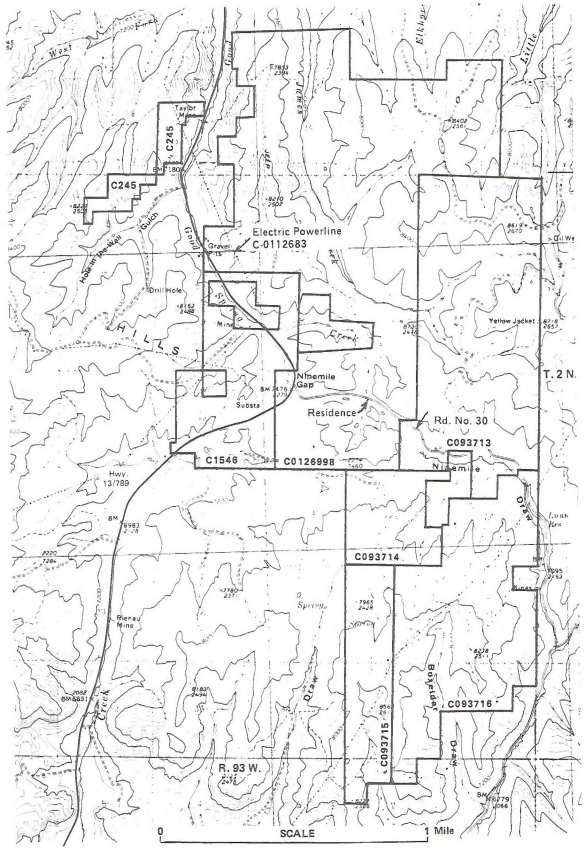
CULTURAL RESOURCES

Affected Environment

The type and distribution of cultural resouces found to date in the PRLA are typical of those found elsewhere in the Danforth Hills. The known cultural resources tend to be clustered along the southwest boundary of the PRLA and are either prehistoric limited activity sites or historical homesteads. Table 3-13 summarizes the cultural resource inventories conducted on the PRLA and table 3-14 provides a summary of the known cultural resources in the project area. Appendix E contains a regional analysis, by inventory, of cultural resources. Three major site types have been identified on the PRLA: isolated finds, historical dwelling and prehistoric open lithic sites. A greater range of site types is known in the Danforth Hills (table E-1, Appendix E). Based on the known density of cultural



Map 3-11 Surface Land Ownership



Map 3-12 Existing Structures and Rights-of-Way

resources on the PRLA and in the Danforth Hills, it is likely that between 20 to 65 sites will be identified in the project area. Until all of the cultural resources have been identified, fully evaluated and consultation with the State Historic Preservation Officer (SHPO) completed, it is not possible to determine the number and kind of sites which will qualify to the National Register of Historic Places.

None of the sites has been evaluated for inclusion in the National Register of Historic Places. Three sites were recommended as potentially eligible and would require evaluation and mitigation if surface disturbance occurred.

A series of rock alignments along James Creek has been identified but not recorded or evaluated. This work should be completed when the tract is inventoried.

All sites were clustered in locales suitable for habitation. However, it also appears that they were not year-round occupation sites, but were seasonal and short term. The remains of human use are sparse.

Environmental Consequences

Less than 20 percent of the tract has been inventoried and no sites have been evaluated for inclusion in the National Register of Historic Places. A full assessment of the potential impacts would not be possible until the cultural resource record has been completed. There are, however, some tentative projections for impact.

TABLE 3-13
RESULTS OF CULTURAL RESOURCE INVENTORIES CONDUCTED ON THE TRACT

Project Location			*Acres Inventoried Within Tract*	*Cultural Resources Identified*	*Reference*
T.	R.	Section(s)			
3	93	27,34,35	519	1 historical site, 1 prehistoric isolated find	Schwartz and Meacham 1980
2	93	2,3,10,11,12,14,15		Rock alignments along James Creek	
2	93	16	120	2 prehistoric and 1 historical site, 4 isolated finds	Henss and Anderson 1979
2	93	3,4,10,11,14	83	None	Hartley 1983
3	93	25,26,27,34,35,36	41	None	Ryan 1978
2	93	1,3,4,9			
2	93	13,14,22	65	None	Jennings and Sullivan 1977
3	93	22	10	2 historical sites	Christensen 1984
3	93	34	28	None	Tate 1980
Total			866		

TABLE 3-14
CULTURAL RESOURCES LOCATED IN THE PROJECT AREA

Site No.	*Site type*	*NRHP Recommendation*	*Mitigation Recommendation*	*Reference*
5RB1220	Historical trash scatters	Not eligible	Avoidance, monitor construction	Henss and Anderson 1979
5RB1221	Open camp	Potentially eligible	Test excavate	Henss and Anderson 1979
5RB1222	Open camp	Potentially eligible	Test excavate	Henss and Anderson 1979
5RB1228	Historical isolated find	Not eligible	No further work	Henss and Anderson 1979
5RB1232	Prehistoric isolated find. Historical trash scatter.	Not eligible	No further work	Henss and Anderson 1979
5RB1235	Prehistoric isolated find	Not eligible	No further work	Henss and Anderson 1979
5RB1236	Historical isolated find	Not eligible	No further work	Henss and Anderson 1979
5RB2606	Historical road bed	Not eligible	No further work	Christensen 1984
5RB2607	Historical telegraph/ telephone line	Not eligible	No further work	Christensen 1984
5RB1924	Prehistoric isolated find	Not eligible	No further work	Schwartz and Meacham 1980
5RB1943	Historical structure Rock alignments	Not eligible Potentially eligible	Complete recordation Test excavate	Schwartz and Meacham 1980 Schwartz and Meacham 1980

Impacts

No Action/No Development Alternatives. Cultural resources in the project area would not be disturbed or destroyed by mining under these alternatives.

Development Alternatives. Under the Proposed Action, all cultural resources would be heavily impacted by mining. Under BLM's Preferred Alternative, required surveys and scientifically acceptable techniques of removal or avoidance of any cultural resources discovered prior to mining would decrease unintentional destruction.

The efficiency of the inventories would depend on topography, vegetative cover, and past land use at any particular site. Such factors would account for hidden and subsurface sites remaining undetected and unprotected. On a regional basis, the potential for destruction of unknown archeological sites would increase in proportion to the number of acres disturbed. However, the occurrence of sites in specific areas would vary in relation to its topography, land use, and environmental constraints.

Under both development alternatives, mining would open previously less traveled areas. Illegal collection and excavation or unintentional damage could destroy irreplaceable data. Vandalism would result in loss of information that might have otherwise been recoverable and applied through scientific research.

Conclusion

Although the following impacts would result, because of mitigation they are not expected to be significant. Accidental destruction or loss of cultural resources could occur during any proposed surface-disturbing activities. Cultural resources could also be vandalized because of a large workforce and greater access into the area.

If a site were excavated to meet mitigative criteria, any data overlooked or not recorded would be permanently lost.

Activities that disrupt the integrity of a site would bias interpretation of the remaining evidence. Recreating earlier cultures and their adaptions to the environment would be difficult.

RECREATION

Affected Environment

The PRLA encompasses approximately 2,400 acres of the Jensen State Wildlife Area. It is open to the public 4½ months each year and offers viewing and hunting opportunties for deer and particularly elk. The area is used intensively during the elk season. On other portions of the PRLA, use is limited to those willing to pay landowners for hunting rights or for access to the 500 acres of public lands within the PRLA. The PRLA lies within Colorado DOW big game management units 12 and 23. According to DOW big game harvest statistics, unit 23 had the highest number of elk hunters and harvest of any other management unit in the state in 1982 and 1983. Unit 12 also receives extensive hunting use.

The PRLA has a relatively natural landscape diversity that is desirable for hunting activities. The recreational opportunities are classified according to: 1) the types of experiences that can be achieved from participation, 2) the variety of activities, and 3) different environmental settings. The primary determinant of these recreation opportunity classes is the setting. It describes the overall environment in which the recreation occurs, influences specific types of activities that can occur, and ultimately determines the resultant types of experiences that users can achieve. The setting is formulated using a number of factors such as remoteness, size, amount of landscape alteration or development, the number of recreational users and their noticeability, and management constraints.

Six broad types or classes of recreational opportunities have been recognized on a continuum or spectrum (Recreation Opportunity Spectrum) ROS, ranging from largely natural and low-use areas to highly developed and intensively used areas.

The PRLA encompasses mainly two types of settings that can be briefly described in the following general terms:

Semi-Primitive Motorized: Areas alongside or near four-wheel drive roads and trails, having mostly natural landscapes, where there are often evidences of other people but numbers seen remain low, and where management controls are evident but not dominant.

Rural: Areas alongside or near paved highways, or having heavily modified landscapes, where there may be considerable evidences or numbers of other people, and where management controls are easily seen.

The majority of the PRLA falls into the semiprimitive motorized ROS class. But the area along the State Highway 13/789 corridor is considered a rural setting because of the highway traffic or numbers of people.

Other than designated camping areas for hunters, there are no developed recreational sites within the proposed area.

Environmental Consequences

Impacts

No Action/No Development Alternatives. Under these alternatives there would be no impact to recreation.

Development Alternatives. Intensive development associated with coal mining would change the recreational setting from semiprimitive motorized and rural to modern urban. The modern urban ROS setting can be generally described as encompassing areas alongside or near paved highways or where the natural landscape is dominated or replaced by man-made developments, where there are great numbers or evidences of other people, or where management controls are numerous and dominate.

Hunting/viewing opportunties within the PRLA and Jensen State Wildlife Area would be lost through the life of the project. The Jensen area, approximately 6,300 acres, would be unavailable to the public because of development and lack of access. The loss of acres of wildlife habitat from surface-disturbing activities would displace game animals, mainly elk, and would displace hunters to other areas. Under BLM's Preferred Alternative, areas would be made available to these hunters.

Off-site impacts would occur from increased train traffic through Little Yampa Canyon along the Yampa River. The recreational setting would not change; however, the traffic increase would be noticeable to users floating the river or hunting in the area. The quality of the recreational opportunities and the setting would diminish.

Areas with intensive development would change the recreational setting from semiprimitive motorized and rural to modern urban.

Conclusion

Even with rehabilitation, these areas might not revert to semiprimitive motorized settings, but would probably change to roaded natural or rural. Roaded natural ROS settings can be briefly described as areas alongside or near improved roads where pickups and sedans can be driven, having natural appearing but modified landscapes, where there are moderate evidences and numbers of other people, or where management controls provide a sense of security. Hunting opportunities would increase after the life of the project. Although the quality of the recreational opportunities and settings would diminish in the Little Yampa Canyon and on the PRLA, there would be no long-term significant impacts to recreation. Mitigation, in the form of nearby access, would help offset lost hunting opportunities as a result of development.

VISUAL RESOURCES

Affected Environment

James Creek has an undulating landscape composed of ridges and valleys. Hillsides consist of broken rock particles and outcrops intermixed with dark green and gray mountain brush. Aspen pockets exist along drainage ways and mix with conifers on northern slopes. The valley floor is horizontal and flat, cut by a mountain stream that winds through a diverse riparian habitat.

The James Creek Valley is a Class II Visual Resource Management (VRM) area. In such areas, retention of the landscape character would be desirable. Any contrast should not attract attention.

Environmental Consequences

Impacts

No Action/No Development Alternatives. There would be no impacts from these alternatives.

Development Alternatives. The proposed project would dominate the relatively natural landscape of ridges, landscape features, and stream and riparian habitat. Silos, conveyors, roads, open pit mining, equipment, powerlines, etc., would dominate the landscape and reduce the area's high visual quality. The VRM Class II objectives could not be met. Loadout facilities, the railroad spur, and portions of the area to be surface mined would be highly visible from the adjacent State Highway 13/789 corridor. Thus, the visual quality along 11 miles of the highway would diminish.

Conclusion

The VRM Class II objectives for the area could not be met and despite reclamation efforts, the area would not return to its original visual quality—an irreversible and irretrievable loss of the visual resource. Present technology limits the ability to economically imitate natural landforms and features such as rock outcrops. Long-term adverse impacts would occur along 11 miles of State Highway 13/789 corridor because of the rail spur and loadout facilities. Surface mining would decrease visual quality. Impacts would occur well beyond the life of the project.

SOCIAL ENVIRONMENT

Affected Environment

Both Meeker and Craig experienced rapid growth in the late 1970s and early 1980s. Craig's growth was

the result of power plant construction and the opening of new coal mines. Meeker's growth was the result of coal and oil shale development. Completion of the power plant, decline in the coal market, and reduction-in-force of C-a and C-b prototype oil shale projects in the Piceance Basin brought an economic slump and accompanying social changes that have gradually grown more severe in both communities.

The towns responded differently to growth and slump. Meeker was smaller, more isolated, more conservative, and grew reluctantly, particularly in view of its long history of disappointments regarding oil shale development. The community had begun to believe that energy development and town growth would actually happen when C-a and C-b reduced the workforce.

Craig, to a much greater degree, accepted growth. For several years many people feared that the town would decline. When the boom came, in spite of its many problems, most citizens of Craig seemed to accept it.

Continued expectations that C-b will receive a substantial Federal loan guarantee from Synthetic Fuels Corporation, and thus reopen in the near future, has kept Meeker housing and business values relatively high during the slump. Also, Meeker has retained good financial status because its initial fiscal conservatism prevented overspending of oil shale trust funds. At present, Meeker has a healthy interest-bearing surplus, has escaped the high costs of upkeep on excessive facilities, and has maintained much of its former social environment. The town leaders and citizens have become more favorable to economic growth, and an economic development committee is active.

Craig, with its larger size and greater population growth, has suffered from a cheapened housing market and numerous business closures.

Craig's current population of 9,100 is almost twice as large as its 1970 population. It retains its place as the commercial hub of northwest Colorado, despite its decline. There is little evidence of any new growth at present. Craig also has established an economic development committee. The population has stabilized since completion of the power plant's Unit 3 and has helped Craig to resemble its former nature in spite of its larger size. Citizens once again speak of its friendliness, and traffic congestion is no longer a serious problem. The town budget was tightened as revenues declined, and some services have been cut. Traditional power groups, such as ranchers, are regaining political strength. The town still looks outward, traditionalism is much weaker, and the city is seen as more of a modern hub than before.

Both Craig and Meeker have an excess of housing. Adequate facilities are available for substantial new growth without becoming boom towns. Residents of both towns are ready for reasonable growth.

Only a few people live along the State Highway 13 corridor between Craig and Meeker. This highway is the principal north-south route in northwest Colorado and is also important for its scenic value.

Environmental Consequences

Increased population would impact the social structure and values of both Meeker and Craig. However, because of the recent population decline, a population increase would be of low to moderate significance.

ECONOMICS

Economic Assumptions

This analysis presents the following scenarios for regional coal production in northwest Colorado.

1. Current trends and conditions. If the present economic conditions continued, coal production would not increase beyond 10 million tons per year by all mines in the region in 1984.
2. No Action/No Development. Regional coal production would increase to 20 million tons per year and other mines would capture the additional (over current trends and conditions) 10-million-tons-per-year share of the market.
3. Development of the PRLA. Regional coal production would increase to 20 million tons per year and Consol would capture the additional (over current trends and conditions) 10-million-tons-per-year share of the market.

Impacts under the No Action/No Develoment alternatives would be slightly larger than those under Consol's proposal. This is based on the assumption that one operation with state-of-the art mining equipment employing 850 persons would be more efficient than many operations with older equipment employing 961 persons.

Impacts from Consol's PRLA development (at construction and at full production of 10 million tons/year), and No Action/No Development alternatives, were assessed against current trends and conditions, which includes the following:

- Basic agricultural labor, proprietors, and services in both counties.
- Basic construction, manufacturing, TCPU (transportation, communications, public utilities), trade,

services, government, and nonfarm proprietors in Moffat and Rio Blanco counties.

- Oil and gas drilling and producton in both counties.
- Uranium production in Moffat County as of April 1983.
- Railroad activity in Moffat County.
- Operations data for Craig Power Plant units 1, 2, and 3.
- Construction and operations data for the Deserado coal mine and railroad, Rio Blanco oil shale lease tract C-a, Cathedral Bluffs oil shale lease tract C-b, Multi-Mineral nahcolite operations, and Moon Lake Power Plant units 1 and 2 (all in Rio Blanco County), and the same data for the Eagle, Trapper, and Colowyo mines (all in Moffat County).

Note: BLM's and CDM's current trends and conditions are the same.

For the economic analysis, base projections were calculated for Rio Blanco and Moffat counties, using the preceeding activities selected from the Basic Activity System of the State of Colorado's Planning and Assessment System.

The energy crisis of the early 1970s and the push for greater energy independence had a severe social and economic impact on northwestern Colorado. Many communities were unprepared for accelerated social and economic change. Efforts to understand, analyze, or accommodate impacts were inadequate and inconsistent. No common methodology, data, and assumptions were used.

In 1982 the Planning and Assessment System (PAS) was created to analyze the cumulative social/economic impacts of oil shale, coal, and other energy projects and basic sector activities in counties in northwest Colorado. PAS is developing an assessment process that can respond quickly to changing circumstances.

The following social and economic quandries face all economists and policy makers within the region:

1. Proposed projects have vastly differing time frames for start-up construction, operations, and shut-down. Some proposals are seemingly imminent, others are projected for the late 1990s, and many proposed projects may never come to pass.
2. Project proponents frequently change both the magnitude and timing for any given project.
3. Detailed economic assessments performed for single projects (and often for one of several phases of a single project) result in only a portion of the potential effects being explored at any point in time.
4. Methodologies and assumptions differ from one assessment to another, making transferability and comparability difficult or impossible. Often methodologies and assumptions are not fully described or documented.

Use of PAS affords a common base of methodology, data, and assumptions and still allows flexibility for local judgment. This system is, therefore, the basis of our methodology.

Coal development in northwest Colorado would cause significant economic impacts to the regions, especially in Moffat and Rio Blanco counties and the communities of Craig and Meeker. The consequences would include front-end capital spending requirements for new housing and community facilities, the loss of agricultural land to residential and commercial uses, competition for labor (which would be disadvantageous to local agriculture and business interests), and inflation of local housing costs.

Development of energy-related projects (not all of which are reasonable at present) could cause serious dependence on the energy-minerals industry. That dependence carries the risk of relatively large and sudden fluctuations in employment, income, and population. Changes in market demand and/or decisions of mining/energy companies headquartered elsewhere cause the fluctuations.

It may not be possible to sustain a viable economic base under the "boom-bust" cycles that have characterized the region's energy/mining development. Although the PAS model assumes the reasonableness of the baseline activities listed for 1985, based on current market conditions, reasonable baseline projections cannot be made as far as 2000.

If any project assumed in the 1985 baseline is diminished or terminated, the cumulative impact projected as a result of the project would also be diminished or terminated.

The impacts of PRLA development that are presented and analyzed are based on employment data supplied by Consolidation Coal Company. A regional construction force of 300 in 1988 and 350 in 1989 is projected for this project. Other projects listed would be completed in 1988 and 1989. Consol's construction would employ 50 to 60 percent of this pool of construction workers; however, impacts would not be as large for the region as otherwise anticipated. Outmigration or unemployment for both Rio Blanco and Moffat counties would be slowed. Therefore, 1991 was selected as a year that would more clearly indicate the nature of the impacts. Impacts would

result primarily from the operations work force that would increase from 417 in 1991 to 916 in 1995 and then decline to a constant 856 for the life of the project.

Significant impacts are defined as changes in population, housing, income, infrastructure, etc., greater than 10 percent.

Employment and Income

Affected Environment

Since economic data are available only by county, economic analysis must be performed by whole counties. In this case Moffat and Rio Blanco counties, Colorado, would be impacted. No significant impacts are anticipated from the James Creek project to other counties.

Employment and income figures are based on the place of work and are more accurate because they take commuting into account. Both Moffat and Rio Blanco counties heavily emphasize mineral extraction and tourism, dominated by summer mountain recreation and fall hunting. Livestock production remains an important factor in both counties but is small compared to other developments. Coal is the leading extractive mineral in Moffat County; oil and gas leads in Rio Blanco County. Employment and income figures are shown by place of residence in tables 3-15 and 3-16.

TABLE 3-15
CURRENT EMPLOYMENT
1984

	Employment (Persons)	*Percentage of Total*
Moffat County		
Agriculture	483	6.8
Mining	817	11.4
Construction	756	10.6
Manufacturing	363	5.2
Trans., comm., utilities	524	7.3
Trade	1,362	19.2
Finance, ins., real est.	215	3.0
Services	771	10.8
Government	1,051	14.8
Unclassified	773	10.9
Total	7,114	100.0
Percentage Unemployed	7.1	
Rio Blanco County		
Agriculture	263	6.4
Mining	1,429	34.8
Construction	260	11.4
Manufacturing	32	.8
Trans., comm., utilities	229	5.6
Trade	337	8.2
Finance, ins., real est.	35	.8
Services	202	4.9
Government	811	19.7
Unclassified	300	7.4
Total	3,898	100.0
Percentage Unemployed	4.9	

Source: Colorado Division of Local Government; Planning and Assessment System, and BLM Estimate 02/20/85

TABLE 3-16
LABOR INCOME
(In Thousands of 1980 Dollars)[1]

Community	*Labor Income*	*Per Capita Income*
Rio Blanco County	$182,846	$12,901
Meeker	39,594	16,463
Rangely	37,864	17,564
Moffat County	133,955	9,494
Craig	98,974	10,876

Source: Colorado Division of Local Government; Planning and Assessment System, 02/05/85

[1]Labor income includes wages, salaries, and proprietor's income.

Growth and decline cycles characterize the region and produce large, frequent fluctuations in employment and labor income, especially in the construction and mining sectors.

Environmental Consequences

Impacts

Employment. Tables 3-17 and 3-18 present impacts that would occur under the various alternatives. Impacts of a 10-million-ton-per-year operation would be less than under the No Action/No Development Alternative of the PRLA where many mines would produce the coal because of economics of scale (see Economic Assumptions).

Expansion of the labor force by 10 percent or greater would occur in 2000 in both Rio Blanco and Moffat counties, if coal production from all sources reached 20 million tons per year or more from northwest Colorado. Significant impacts could occur in Meeker in 1991 and in both Craig and Meeker by 2000. Impacts from Consol's development over no development would not be significant.

Income. Significant changes in labor income could occur in the towns of Meeker and Craig, and in Moffat County in 1991. By 2000, there would be significant changes in Meeker and Craig and in Rio Blanco and Moffat counties. The impacts are significant because the labor income base expands from 4 to 18 percent in the region by the year 2000 from all coal development. Impacts from Consol's development over no development would not be significant. Tables 3-19 and 3-20 present impacts that would occur under the various alternatives.

TABLE 3-17
COUNTY EMPLOYMENT
(Persons)

Total Coal Production by County	Total Employment	Impact Attributable to Development	Percentage Impact From Current Levels	Percentage Change From No Development
Year 1991				
Rio Blanco County				
Current conditions and trends	5,101			
Development of PRLA	5,329	228	4	-1
No development of the PRLA	5,379	278	5	
Moffat County				
Current conditions and trends	7,030			
Development of PRLA	7,449	419	5	-3
No development of the PRLA	7,648	618	8	
Cumulative				
Current conditions and trends	12,131			
Development of PRLA	12,778	647	5	-1.8
No development of the PRLA	13,027	896	6.8	
Year 2000				
Rio Blanco County				
Current conditions and trends	4,947			
Development of PRLA	5,453	506	9	-1
No development of the PRLA	5,509	562	10	
Moffat County				
Current conditions and trends	7,338			
Development of PRLA	8,119	781	10	-4
No development of the PRLA	8,545	1,207	14	
Cumulative				
Current conditions and trends	12,285			
Development of PRLA	13,572	1,287	9.4	-3.1
No development of the PRLA	14,054	1,769	12.5	

TABLE 3-18
COMMUNITY EMPLOYMENT
(Persons)

Total Coal Production by Community	Total Employment	Impact Attributable to Development	Percentage Impact From Current Levels	Percentage Change From No Development
Year 1991				
Meeker				
Current trends and conditions	2,538			
Development of PRLA	2,835	297	10	0
No development of the PRLA	2,834	296	10	
Craig				
Current trends and conditions	5,170			
Development of PRLA	5,551	381	7	-2.7
No development of the PRLA	5,730	560	9.7	
Year 2000				
Meeker				
Current trends and conditions	2,521			
Development of PRLA	3,052	531	17	-.3
No development of the PRLA	3,052	531	17.3	
Craig				
Current trends and conditions	5,447			
Development of PRLA	6,164	717	11.6	-5.4
No development of the PRLA	6,556	1109	17	

TABLE 3-19
COUNTY LABOR INCOME
(In thousands 1984 dollars)

Total Coal Production by County	Total Labor Income	Impact Attributable to Development	Percentage Impact From Current Levels	Percentage Change From No Development	Per Capita (Dollars)
Year 1991					
Rio Blanco County					
Current trends and conditions	125,527				16,215
Development of PRLA	131,365	5,838	4	-1	16,755
No development of the PRLA	132,686	7,159	5		16,171
Moffat County					
Current trends and conditions	132,757				10,179
Development of PRLA	143,353	10,596	7	-3	10,855
No development of the PRLA	148,524	15,767	10		11,117
Cumulative					
Current trends and conditions	258,284				12,426
Development of PRLA	274,718	16,434	6	-2	12,879
No development of the PRLA	281,210	22,926	8		13,040
Year 2000					
Rio Blanco County					
Current trends and conditions	120,441				16,142
Development of PRLA	133,866	13,425	10	-1	15,756
No development of the PRLA	135,459	15,018	11		15,767
Moffat County					
Current trends and conditions	138,930				10,749
Development of PRLA	158,969	20,034	12	-5	11,170
No development of the PRLA	169,833	30,903	18		11,539
Cumulative					
Current trends and conditions	259,371				
Development of PRLA	292,830	33,459	11	-4	12,723
No development of the PRLA	305,292	45,921	15		13,098

TABLE 3-20
COMMUNITY LABOR INCOME
(In thousands 1984 dollars)

Total Coal Production by Community	Total Labor Income	Impact Attributable to Development	Percentage Impact From Current Levels	Percentage Change From No Development	Per Capita (Dollars)
Year 1991					
Meeker					
Current trends and Conditions	62,767				20,098
Development of PRLA	72,146	9,379	13	+2	20,899
No development of the PRLA	70,652	7,885	11		20,060
Craig					
Current trends and conditions	101,862				9,814
Development of PRLA	111,714	9,852	8.8	+3.2	10,547
No development of the PRLA	116,534	14,672	12		10,938
Year 2000					
Meeker					
Current trends and conditions	62,800				19,892
Development of PRLA	78,501	15,701	20	+2	20,669
No development of the PRLA	77,133	14,333	18		20,086
Craig					
Current trends and Conditions	107,240				10,181
Development of PRLA	126,156	18,916	15	+6	11,009
No development of the PRLA	136,414	29,174	21		11,549

Housing and Population

Affected Environment

Population. Uneven population distributions characterize the area. Moffat County's population concentrates heavily in the eastern part of the county, primarily in Craig. Settlement in Rio Blanco County clusters around Meeker and Rangely. Areas between the population islands consist of sparsely settled ranching country and unpopulated state or Federal land. Table 3-21 presents the population base for the region.

Housing. Vacancy rates between 9 and 27 percent exist in communities in the region, indicating a housing surplus. Communities could absorb growth from 9 to 27 percent without significant impacts.

TABLE 3-21
CURRENT POPULATION [1]
1984

Location	*County*	*County Division*	*Community*
Rio Blanco County	6,398		
Meeker Census Division		3,723	
Meeker			2,405
Rangely Census Division		2,675	
Rangely			2,156
Moffat County	14,109		
Craig C.C.D.		10,012	
Craig			9,100
Dinosaur-Maybell		918	
Unincorporated		3,179	

[1]Colorado Division of Local Government; Planning and Assessment System, and BLM Estimate. 02/05/85

Vacancy levels in table 3-22 do not indicate either unit's physical condition or whether they are year-round or seasonal units.

Environmental Consequences

Impacts

Population. Potentially significant impacts (expansion of the population base by 10 percent or greater) would occur by 2000 in both Rio Blanco and Moffat counties and also in Craig and Meeker from all coal development. Impacts from Consol's development over no development will not be significant. Tables 3-23 and 3-24 present impacts to the region.

TABLE 3-22
HOUSING UNITS 1984

County	*Occupied*[1]	*Vacant*[2]	*Percentage Vacant*
Moffat			
Craig	2,947	340	12
Dinosaur	105	28	27
Rio Blanco			
Meeker	1,039	162	16
Rangely	807	72	9

[1]Source: Colorado Division of Local Government; Planning and Assessment System

[2]BLM estimate based on a survey of each city's planning department. 12/07/84

TABLE 3-23
COMMUNITY POPULATION

Total Coal Production by Community	Population (Persons)	Impact Attributable to Development	Percentage of Impact	Percent Change From No Development
		Year 1991		
Meeker				
Current trends and conditions	3,123			
Development of PRLA	3,452	329	10	-1
No development of the PRLA	3,522	399	11	
Craig				
Current trends and Conditions	10,379			
Development of PRLA	10,592	219	2	-.5
No development of the PRLA	10,654	275	2.5	
		Year 2000		
Meeker				
Current trends and Conditions	3,157			
Development of PRLA	3,796	641	17	-.7
No development of the PRLA	3,840	683	17.7	
Craig				
Current Trends and Conditions	10,533			
Development of PRLA	11,459	923	8	-2.8
No development of the PRLA	11,811	1278	10.8	

TABLE 3-24
COUNTY POPULATION
(Persons)

Total Coal Production by County	Population (persons)	Impact Attributable to Development	Percentage of Impact	Percentage Change From No Development
Year 1991				
Rio Blanco County				
Current trends and conditions	7,741			
Development of PRLA	8,124	383	4	-1
No development of the PRLA	8,205	464	5	
Moffat County				
Current trends and conditions	13,041			
Development of PRLA	13,206	165	1	-1
No development of the PRLA	13,359	318	2	
Cumulative				
Current trends and conditions	20,782			
Development of PRLA	21,320	548	2.5	-3
No development of the PRLA	21,564	782	3.6	
Year 2000				
Rio Blanco County				
Current trends and conditions	7,461			
Development of PRLA	8,496	1,035	12	-1
No development of the PRLA	8,591	1,130	13	
Moffat County				
Current trends and conditions	12,924			
Development of PRLA	14,231	1,307	9	-3
No development of the PRLA	14,717	1,793	12	
Cumulative				
Current trends and conditions	20,385			
Development of PRLA	22,727	2,342	10	-2.5
No development of the PRLA	23,308	2,923	12.5	

Housing. Because of the large vacancy rates that are present in both Craig and Meeker, any influx of people to either community would most certainly absorb current available units. This condition could result in short-term housing stabilization of price, but long-term local inflation of housing as the supply dwindles to less than demand by the year 2000. Table 3-25 presents housing demand in 1991 and 2000.

Local Government Finances. Under all alternatives, increased coal production in the region would be assigned to existing mines (see Economic Assumption section). As a result of this alternative, it is assumed that the region would increase coal production by a maximum of 10 million tons by the year 2000. If that occurred, revenue would increase at all levels of government. The operations would pay royalties to the

TABLE 3-25
HOUSING UNITS

Total Coal Production by Community	Housing Demand	Impact Attributable to Development	Percentage of Impact	Percentage Change From No Development
		Year 1991		
Meeker				
Current trends and conditions	1,352			
Development of PRLA	1,507	155	11	-1
No development of the PRLA	1,538	186	12	
Craig				
Current trends and conditions	3,302			
Development of PRLA	3,393	91	2.6	-.4
No development of the PRLA	3,413	111	3	
		Year 2000		
Meeker				
Current trends and conditions	1,380			
Development of PRLA	1,659	279	17	-.7
No development of the PRLA	1,677	297	17.7	
Craig				
Current trends and conditions	3,352			
Development of PRLA	3,670	318	8.6	-2.7
No development of the PRLA	3,783	431	11.3	

Federal government and property taxes to the county government.

Employees and secondary businesses would pay property taxes, sales taxes, and other charges to the municipal and county governments. Severance taxes cannot be projected because the formula requires data in operating cost to determine taxable revenue; however, impacts would be large.

Preparation for economic impacts requires lead time. Local governments, departments, etc., would be informed of new plans and changes in plans by companies and Federal agencies as soon as possible. This would allow construction of additional infrastructure ahead of the demand or cancellation of preparations before they are irretrievably committed. Likewise, timing of Federal actions so that they do not occur simultaneously with other large private or public developments would minimize local growth and contraction problems.

Conclusion. The principal unavoidable adverse economic effects would increase the financial strain on the communities. Other adverse effects would be the aggravation of local inflation, especially in housing costs and local business, and difficulties in meeting wage competition from the mine and construction sectors. These unavoidable effects have no immediate and forseeable mitigative processes. In the long term, some effects could be mitigated, but to what extent could not be estimated.

Long-term impacts would be growth in the local labor force and economic infrastructure, both of which would benefit business and residents. However, the long-term risk of excessive economic dependence on a single industry would be increased.

Growth in population of about 2,300 would be irreversible, except at considerable economic and human cost. Commitment of economic resources to additional

TABLE 3-26
DOLLARS GENERATED IN 1983

Year	*County*	*Total Generated*	*State Share (50%)*	*County Share*
1983	Rio Blanco	46,312,400	23,156,200	393,750
1983	Moffat	8,309,170	4,154,585	393,750

housing, commercial and industrial facilities and infrastructure would be irretrievable.

The Federal government would contribute monies to state and local governments to mitigate the effects of Federal leasing and landownership. The Federal Lands Policy and Management Act (FLPMA), Section 317 (a), provides that 50 percent of all monies received from sales, bonuses, royalties, and rental of public lands be paid to the state where the leased lands or deposits are located. Monies are to be used as the legislature of the state may direct; priority is given to state subdivisions socially or economically impacted by development of minerals leased under this act, as shown under the county in table 3-26. Colorado Senate Bill 35 (1977) distributes the state's share:

Category	*Percentage Share*
Public School Fund	25
Energy Impact Assistance Fund	15
Colorado Water Conservation Board	10
County Involved	50—up to $800,000

Any annual excess over $800,000 goes to the public school fund. Counties may also receive additional funds through project grants from the Energy Impact Assistance Fund or through other Federal programs. Table 3-27 shows 1983 monies generated in the two counties as a result of Federal leasing and the amount returned to state and local governments. Together, the two counties generated just under 55 million dollars in 1983, from rentals and royalties of public lands.

TABLE 3-27
1982 AGRICULTURE EARNINGS[1]
(In Thousands)

County	*Livestock Products*	*Crops*	*Total*
Moffat	$8,948	$3,194	$12,142
Rio Blanco	$7,800	$ 914	$ 8,714

[1]Source: Bureau of Economic Analysis, Regional Economic Information System, 1983. BEA Farm Income and Expenditures. U.S. Department of Commerce, Washington, D.C.

The counties' share of generated royalties and rentals is subject to 34-63 Colorado Revisal Statute, which places the 50 percent Federal return subject to distribution approval of the State legislature. Severance taxes imposed by the states are also used for economic and social mitigation. In addition, towns and counties have authority to impose zoning and to negotiate tax prepayment and other arrangements with industries for these purposes.

Economic Impacts on Other Resources

Affected Environment

Agriculture. Livestock production is the principal agricultural activity in both Moffat and Rio Blanco counties. Crop production is dominated by hay for livestock feed. Individual proprietor's 1982 livestock and crop earnings averaged about $12,100 for Moffat County and $8,700 for Rio Blanco County (table 3-27).

Wildlife. Hunting is the only significant economic activity on the proposed PRLA. In 1982, an estimated 89,000 nonresident hunter days were spent in Rio Blanco County. At an average of about $56, in 1980 dollars, for nonresident hunters (McKean and Weber 1978), the economic value to the county was approximately $4,950,000. No figures of actual hunter days are available for the PRLA; however, BLM estimates these days would be less than 1 percent of the total economic value for wildlife.

Local Government Finances. Area communities obtain most of their revenue locally. As shown in table 3-28, local sources generate 71 to 94 percent of total community revenues. That means that the communities can be highly impacted by developments that affect their tax base. Area school districts depend less on locally generated revenues because of the state equalization formula. The only school district that obtains more than 70 percent of its funds locally is Rangely, because of its a high per capita assessed valuation from mineral development (table 3-29).

Rough measures of local funding sources are provided by per capita figures on assessed valuation and retail sales. Larger communities generally have more substantial property tax bases, and community sales tax bases vary accordingly. The sales tax may account for up to 31 percent of total community revenues. Communities with strong retail sales bases generally have business or tourist centers that handle financial impacts better than other communities.

At present, the communities' abilities to increase revenue sources are restricted. State law imposes a 7 percent limit on annual increases in property tax

TABLE 3-28
LOCAL GOVERNMENT FINANCIAL DATA
(dollars in thousands)

	Craig	*Dinosaur*	*Meeker*	*Rangely*
Source of Revenue 1984				
Local %	87	94	71	73
State %	9	4	23	21
Federal %	3	1	3	5
Other %	1	1	3	1
Assessed Valuation (1982)				
Total	$28,109	428	9,808	10,640
Per Capita	$ 2,810	670	4,078	4,935
Mill Levy	12.0	13.227	6.662	14.344
Sales Taxes (FY83)				
Total	$ 2,261	10	304	764
Per Capita	$ 266	30	126	354
Sales Tax Rate (%) (07/01/83)	2.0	2.0	0[2]	0[2]
Bonded Debt (12/31/82)				
General Obligation	$ 7,015	0	0	199
Revenue	$ 60	0	1,294	640
Remaining Bonding Capacity	[1]	$43	980	1,064

Sources: Colorado Division of Property Taxation, Eleventh Annual Report Colorado Division of Local Government, 1982. Local Government Financial Compendium Colorado Department of Revenue, Annual Report 1983

[1]Percentage of assessed valuation, less general obligation bonded debt. Percentages are: Community: 10% (3% of actual valuation which, at 30% assessment rate, equals 10% of assessed valuation) School Districts: 20%

[2]Receives county sales tax (2.0 percent) of revenue collected within city limits.

revenues and a 4 percent ceiling on combined municipal and county sales tax rates. Since only Rio Blanco County presently has a sizable sales tax (2 percent), most communities within Rio Blanco County have some leeway to use revenues through county sales tax. The state equalization formula controls school district property tax revenues.

Figures on remaining bonding capacity in tables 3-28 and 3-29 indicate: (1) how much major capital improvement could be funded from local sources, and (2) the size of the existing debt burden. State law imposes the ceilings shown in the footnotes. All communities and school districts have more than half of their bonding capacities still available for use and can meet low to moderate growth levels. These amounts, however, would be insufficient to meet major economic growth in Meeker and Rangely.

Environmental Consequences

Impacts

Agriculture. On a county-wide basis, effects of development on agriculture would be insignificant. Combined reductions in agricultural earnings from loss of grazing land and conversion of irrigation water

TABLE 3-29
LOCAL SCHOOL DISTRICT FINANCIAL DATA
(Dollars in thousands)
(1984)

	Meeker School District	*Rangely School District*	*Moffat County School District*
Source of Revenue (1984)			
Local %	68	95	67
State %	28	4	29
Federal %	4	1	4
Assessed Valuation (1982)			
Total	$45,970	417,280	288,703
Per Capita	$12,347	155,992	20,080
Mill Levy		$ 11.68	25.91
Sales Taxes	N/A	N/A	N/A
Sales Tax Rate	N/A	N/A	N/A
Bonded Debt (000)			
General Obligation	$ 0	0	7,470
Revenue	$ 1,068	0	
Remaining Bonding[1] Capacity	$18,125	83,456	50,271

Sources: Colorado Division of Property Taxation, Eleventh Annual Report Colorado Division of Local Government, 1982 Local Government Financial Compendium Colorado Department of Revenue, Annual Report 1983

[1]Figures include enterprise funds (water, sewer, etc.), but exclude large one-time federal grants.

and cropland to industrial and urban uses would total no more than 1 percent of the total economic value for agriculture.

Wildlife. Smaller wildlife populations would decrease hunting opportunities and would reduce spending by hunters by approximately 1 percent in only Rio Blanco County.

Local Government Finances. Under this alternative, the increased regional coal production would be assigned to existing mines and/or Consol (see Economic Assumption section). As a result, the region would increase coal production by a maximum of 10 million tons by 2000. If that occurred, revenue would be increased at all levels of government. The operations would pay royalties to the Federal government and property taxes to the county government.

Employees and secondary businesses would pay property taxes, sales taxes, and other charges to the municipal and county governments. Severance taxes cannot be projected because the formula requires data in operating cost to determine taxable revenue. Impacts would be large.

The Federal royalty rate of 12.5 percent per ton of coal produced under an assumed weighted average price of $20.00 per ton, would amount to $50,000,000 at the maximum production of 20 million tons per year. The state of Colorado receives 50 percent of Federal royalties, which would be $25,000,000 under the maximum production.

Fifty percent of this share, or a maximum of $800,000, should be returned to the county of origin. Thus, Rio Blanco County should receive 50 percent of Federal royalty revenues returned to the state of Colorado under this alternative.

Estimated capital benefits and costs are shown in table 3-30. Definition of terms and analytical methods are given in notes to the table. Most infrastructures, already built to accommodate over 15,000 persons, would need only repair or modernization. School districts should have little difficulty financing their additional needs.

TRANSPORTATION

Affected Environment

Based on the Colorado Department of Highway Study (1980), present traffic volume on Colorado Highway 13 between Meeker and Craig is approximately the same as it was in 1980 (table 3-31 and map 3-13).

TABLE 3-30
CUMULATIVE COMMUNITY BONDING CAPACITY AND CAPITAL REQUIREMENTS
(Dollars in Thousands)

Year	*Community*	*No Development*	*20 Million Tons*	*15 Million Tons*	*12 Million Tons*
2000	Meeker				
	Bonding Capacity	1,565	1,548	1,380	1,291
	Capital Requirements	0	1,800	1,000	70
	Craig				
	Bonding Capacity[1]	1,315	3,216	2,135	2,030
	Capital Requirements	1,600	1,600	1,200	980
	Meeker School District				
	Bonding Capacity	13,454	13,307	11,860	11,000
	Capital Requirements	0	3,950	2,888	580
	Moffet County School District				
	Bonding Capacity	60,227	58,238	56,724	55,063
	Capital Requirements	2,817	2,817	2,662	1,780

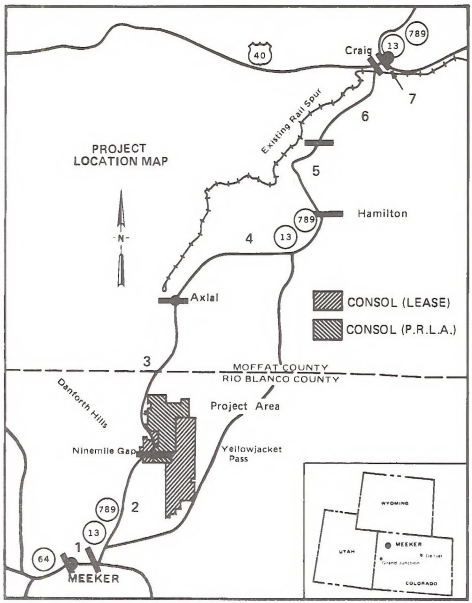
Note: This analysis discusses the impact on capital budgets, usually the most severe impact accompanying energy development.

Two measures are used: bonding capacity and capital requirements. Bonding capacity is a limit established by the State legislature on the dollar value of general obligation bonds a local jurisdiction may have outstanding. It is based on assessed valuation, amounting to approximately 10 percent for communities and 20 percent for school districts. Home rule cities are not subject to this limit but, since voter resistance increases as more bonds are issued, a similar limit may well apply. General obligation bonds outstanding as of 12/31/84 (the latest published data) were subtracted from gross bonding capacity because the tracts are not included and because of the difficulty of projecting the assessed valuation of oil shale properties.

Capital requirements are an estimate of the investment in capital improvements that would be necessitated by population growth. Complete capital budgeting for the jurisdiction was, of course, impossible. Seven items were estimated for communities: water and wastewater systems, fire truck pumping capacity and fire station space, municipal and police office space, and police vehicles and ambulances. Classroom space was estimated for school districts. They include most, though not all, of the most costly types of facilities. Requirements were estimated by local use rates, where available, or population-based standards, with present capacities then subtracted. The resultant estimates are order-of-magnitude only, but they highlight the jurisdictions that can have fiscal problems if these developments occur.

Counties are excluded from this analysis because many of their facility requirements cannot be estimated by a direct ratio to population.

[1]Home rule city - Craig.



Map 3–13 Transportation and Highway Segment Numbers

TABLE 3-31
1980 TRAFFIC ON STATE HIGHWAY 13

Section	*Daily Traffic Volume*	*Peak Hour*	*Design Capacity Traffic (per hour)*	*Percentage of Capacity*
1	2,900	348	760	46
2	1,250	175	760	23
3	1,150	138	790	18
4	1,400	168	790	21
5	1,750	210	790	27
6	2,500	300	790	38
7	3,500	420	790	53

Environmental Consequences

Impacts

No Action/No Development Alternatives. Under the No Development Alternative, road and rail traffic would not increase. Traffic would remain at the 1980 base level (table 3-32).

Development Alternatives. Population increases, traffic to and from the mine, and coal hauled by truck would increase traffic on State Highway 13 between Meeker and Craig. Table 3-32 shows projected traffic volumes under all development alternatives.

TABLE 3-32
TRAFFIC PROJECTIONS ON STATE HIGHWAY 13
(For 10 Million-Ton-Per-Year Production)

*Highway Section**	*Daily Traffic Volume*	*Peak Hour Traffic*	*Design Capacity (per hour)*	*Percentage of Capacity*	*Percentage Increase*
1	3,190	790	760	104	58
2	1,375	600	760	79	56
3	1,265	335	790	44	26
4	1,540	365	790	46	25
5	1,925	410	790	52	25
6	2,750	510	790	65	27
7	3,850	640	790	81	27

*See figure 3-11 for location of sections

Peak hour traffic increases due to shift changes might cause traffic congestion at Meeker and Craig. Congestion would cause a drop in the traffic speed by 10 mph. Heavier daily traffic volumes would cause more rapid wear of pavement surface, and highway maintenance needs would increase. Map 3-13 identifies highway segments analyzed.

The additional 7 unit trains (100 cars) per day under the applicant's proposal would not significantly affect the rail line. These additions would be well within the capacity of the rail line.

Conclusion

The present highway system could accommodate the estimated traffic for a mine producing up to 5 million tons per year. Since Colorado Department of Highways studies have shown that serious traffic congestion generally occurs as the peak hourly traffic approaches 80 percent of highway capacity, careful scheduling of office and production hours would be necessary at a peak production of 10 million tons per year. No significant impacts are expected.

Traffic accident statistics indicate an increase from 3.60 to 4.05 accidents per million vehicle miles, or a possible increase of four accidents per year under the Development Alternatives.

NOISE

Affected Environment

At present, the proposed mine site is open grazing land with little human habitation or intrusion. State Highway 13, on the west edge of the project area, is a medium traffic road with noise levels of 35 decibels or less along the right-of-way boundaries. Noise impacts would be insignificant to towns in the area.

Environmental Consequences

Impacts

No Action/No Development Alternatives. Noise would not increase.

Development Alternatives. Noise levels would increase at the mine site because of heavy equipment use and truck or conveyor noise on the haul route to the loadout facility. There would be a second noise point source at the loadout.

Blasting noise in a pit behind the screening ridge would have no significant impact on people riding in vehicles on State Highway 13.

Off-site noise level increases would be the result of increased traffic on State Highway 13 and train traffic on the rail spur to the mine loadout.

Mine noise would be held to an undiscernable level (less than a 3-decibel increase) because of the physical location of the project. A high ridge between James Creek and State Highway 13 would block most, if not all, sound from the mining and hauling operations. Distance between the ridge and highway would further reduce noise.

Because of the location, loadout facility noise would also be held to minor levels. The distance between the facility and State Highway 13 would be 700 to 800 feet, and the distance to the nearest home would be over 3,000 feet. A noise level of 60 decibels at 50 feet from the loadout chutes would be discerned as 36 decibels on the highway (35 decibels or less now). Studies have shown an increase of less than 3 decibels is not discernable to a normal human ear.

Traffic noise increases, even during peak hour traffic, probably would not be noticeable off the right-of-way. There is one home along State Highway 13 that is close to the right-of-way fence, about 1/2 mile north of the confluence of Good Spring Creek and James Creek. Increased noise may be noticeable and bothersome to these residents.

Railroad train noise might be a factor along the spur, depending on the track's location. However, train traffic would be limited.

Conclusion

Insignificant impact increases in noise levels would result.

NET ENERGY

Net energy analysis is a computation of the energy requirements to produce coal. The energy of the coal produced divided by the energy required to produce

it yields a net energy ratio. Units are calculated in British thermal units (Btus) of energy and pounds (lbs) of coal.

For this study, a conservative estimate of 10,000 Btu/lb was used for the coal energy. Each pound of coal would produce an estimated 10,000 Btus. Factors considered in production included energy requirements for mining operation, product transportation, employee transportation, and infrastructure support. Although the numbers may vary at different levels of production, the base ratio is 122:1 or 122 Btu of energy produced for each Btu of energy expended.

MITIGATION (From Which the Preferred Alternative was Derived)

Feasible Mitigation

Feasible mitigation includes those stipulations that are appropriate at the leasing level, rather than at the mine permitting stage, and are workable and enforceable with current levels of data and information. Some have been incorporated into the Preferred Alternative and/or modified to make them more practical or workable. This section, however, presents all mitigation, whether adopted by BLM or not, in order to inform the reader of the range of mitigation considered. It also identifies mitigation as possible stipulations, including supporting rationale and possible methods to meet standards identified in the stipulation.

Wildlife

Possible Stipulation: The lessee shall comply with all applicable wildlife regulations, and, in addition, shall provide supplemental measures designed for the protection and propagation of wildlife species found in the project area.

Rationale: The existing mitigative measures and regulations do not adequately ensure the protection of all of the wildlife species found in the project.

Methods: The supplemental methods include:

- Establishing modified buffer zones wider than 100 feet of stream (boundaries and restrictions will be determined during the permitting process); and/or
- Replacing the vegetation in the proportions of 50 percent shrubland, 25 percent aspen, and 25 percent grasslands, with the postmining aspen stands having a density of 500 stems per acre, which are at least 5 feet in height, and which have survived at least 5 years (although natural stands of aspen have 2 or 3 thousand stems per acre, they are not all 5 feet high, and they do not all survive for 5 years). After discussions with numerous individuals, including Wayne Shepperd, Research Forester with the U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station, the standard of 500 stems per acre which are at least 5 feet tall and which have survived at least 5 years, was decided on by BLM. Consideration was given to the fact that the site was marginal, that it would be 50 or more years before the post-mining stand would resemble the preming stand, and that any standard must be practical.); and/or
- Establishing separate soil stockpiles for the soils removed from aspen stands or directly hauling soils from the present aspen sites to the proposed aspen sites unless this special handling of soils under aspen stands is demonstrated to be unnecessary.

Water Resources (Surface and Underground)

Possible Stipulation: The lessee will comply with all applicable regulations regarding the replacement of water sources, and, in addition, shall replace major perennial springs and seeps currently present in the upper reaches of the James Creek watershed. These water sources shall supply water until such time when the zones of saturation in the spoils aquifer contact incised valleys and significantly contribute acceptable groundwater to the upper reaches of James Creek.

Rationale: The majority of the springs and seeps in the James Creek watershed will be removed by the mining operation. Decades will be required before significant amounts of good-quality groundwater will emanate from the spoils aquifer in the upper reaches of James Creek. In addition, the concentrations of total dissolved solids are anticipated to be high. Although Consol is committed to the construction of water impoundments, BLM must eventually bear the cost of the maintenance of these structures and the replacement of breached structures. Also, the perennial nature of these sources is questionable.

Methods: Possible methods of fulfilling above stipulation include:

1. Creating "artificial" springs by burying impermeable membranes or other types of aquifuges into the overburden pile during the reclamation phase (although these practices are experimental and unproven, BLM anticipates that they would be successful);
2. Establishing a long-term commitment from the lessee to maintain and replace water impoundments after the reclamation phase; and/or

3. Establishing other measures that will ensure perennial water sources in the upper reaches of James Creek.

Possible Stipulation: The lessee will comply with all applicable regulations regarding water quality, and in addition, shall apply technically feasible methods that will help reduce increases in levels of total dissolved solids and total suspended solids and maintain flows in James Creek that are reasonably similar to premining flows. Specific standards for TDS, TSS, and discharge levels will be determined at the mine plan stage.

Rationale: Mining will remove or adversely impact a major portion of the recharge areas of James Creek. This could cause adverse impacts to James and Good Spring creeks because of reduced flows and increased TDS values.

Methods: Possible methods of fulfilling the above stipulation include:

1. Establishing a modified stream buffer zone that is wider than 100 feet;
2. Pumping water from the mine pit into James Creek, if the quality is acceptable;
3. Installing a series of channel stabilization structures in James Creek, Little Creek, and Elkhorn Creek: rock structures, drop structures, log sills, check dams, or other acceptable means of retaining or detaining sediment;
4. Constructing a system such as a coal conveyor or slurry pipeline to replace the proposed haul road;
5. Relocating the overburden stockpile out of the headwaters of James Creek;
6. Routing runoff around the overburden and topsoil stockpile areas; and/or
7. Constructing or establishing other acceptable methods of reducing mining impacts to water quality and quantity.

Possible Stipulation: The lessee shall design a surface and groundwater monitoring plan in accordance with all applicable OSM and CMLRD regulations, and, in addition, shall continue to monitor the established stations J1, J7, J8, J9, J10, J11, J13, G8, and G9; establish a monitoring station immediately downstream from the James Creek and Good Spring Creek confluence; and perform a series of seepage runs before, during, and after mining.

Rationale: The above-mentioned water-monitoring stations are in locations that facilitate the determination of water quality and quantity trends. Seepage runs are necessary to determine the extent and source of groundwater contributions to James Creek.

Methods: Water quality component analyses are to be performed at EPA-approved labs. Quantity determinations are to be performed by technically acceptable methods.

Cultural Resources

Possible Stipulation: Cultural resources will be identified and significant data retrieved and/or protected in those areas that will be subject to surface disturbing activities.

Rationale: Cultural resource identification and protection is mandated by various Federal laws and regulations.

Method:

1. Inventory will be conducted in those areas that have not previously been inventoried and will be subjected to surface disturbing activity.
2. Inventory will be conducted by a qualified professional cultural resource professional.
3. A report of the inventory and recommendations for protecting identified cultural resources will be prepared and submitted to the reviewing Federal/state agencies.
4. All identified cultural resources will be protected until a mitigation plan has been prepared, accepted by Federal, state agencies and fully implemented.
5. Cultural resources not previously identified that are discovered during mine development and operation will be protected and BLM will be notified.

Paleontological Resources

Possible Stipulation: The lessee shall comply with all applicable regulations regarding paleontological resources, and in addition, shall comply with the stipulations listed in Appendix C.

Rationale: Existing mitigative measures and regulations do not adequately ensure the protection of paleontological resources.

Method: The supplemental methods include:

- The lessee shall contact the authorized officer of the appropriate state or Federal agency to determine whether the lessee must conduct and fund a paleontological appraisal prior to disturbing the land.
- Lessee shall protect all paleontological finds in conformance, as required, in the approved mining and reclamation plan.
- Lessee shall immediately bring any such paleontological finds that might be altered or destroyed by

TABLE 3-33
PALEONTOLOGICAL MITIGATION LEVEL

Classification	*Mitigation*
Critical (Class I-A) Any locality from which holotype or critical reference material (i.e., paratype, lectotype, etc.) has been collected. Any type geologic reference section which is critical for future references.	Critical No action will be allowed which will damage the fossil resource or alter the contextural relationships of fossil materials. Materials may be removed, but by special permit only to qualified professionals.
Significant (Class I-B) Any locality which contains rare, exceptionally well-preserved or critical materials for stratigraphic or paleoenvironmental interpretation.	Significant Depending on the size of the deposit, approved mitigation may include total salvage or may be limited to a statistically valid sample of all forms present.
Important (Class II) Any locality which has produced plentiful, relatively common in the locality and elsewhere, fossil materials which are useful for stratigraphic and variability studies.	Important A statistically valid sample will be obtained to mitigate any adverse impact on the resource.
Insignificant Any locality which produces poorly preserved, common elsewhere or stratigraphically unimportant material.	Insignificant Mitigation is optional.
Unimportant (Class III) Any locality which has been intensively surveyed and determined to be of mineral scientific interest. This can include the outcrop of geological formations described as unfossiliferous in technical journals or publications.	Unimportant No mitigation necessary.

mining or reclamation to the attention of BLM prior to moving or altering the find.

Table 3-33 lists the classification and level of mitigation for each class.

Other Resources

Geologic Hazards. Reclamation and replacement of the steeper slopes may require dewatering and backfill material during spring snowmelt months.

Floodplains. If loadout facilities and/or transportation facilities are located within the 100-year floodplain boundary, the operator will be required to install appropriate flood control measures for the control of runoff and sediment. Consol has agreed to this requirement. As proposed, no coal excavation activities will take place within the 100-year floodplain. Care shall be exercised in designing flood control measures to ensure protection of Highway 13/789 and the ranch property located about three-fourths of a mile downstream from James Creek and Good Spring Creek confluence.

Infeasible Mitigation

The following measures are provided here for the readers' information. They were initially considered as mitigative measures, but they were dropped for various reasons, as explained in each section.

Establishing A Buffer Strip

Establishing a buffer strip would prohibit surface disturbing activities in a large area adjacent to James Creek. The boundaries of this buffer strip would have been based on specific elevations and would have varied, depending upon the location in the watershed and the degree of slope. The buffer strip boundary would vary from 8,000 feet in elevation in the headwaters to either 7,400 or 7,800 feet on the north end of the PRLA, depending on the aspect. The surface area taken out of coal production would have been about 430 acres. The haul road would have been relocated to the east out of James Creek.

Taking large amounts of coal out of production would not protect the affected resources to any greater degree than a partial buffer strip and would have unnecessarily hindered the recovery of the coal resource.

In addition, moving the road out of James Creek would cause more surface disturbance with the construction of the new road and an increased safety hazard from large coal trucks traveling steep grades, if trucks were used rather than conveyors.

Changing Mining Sequence

Commencing mining operations on the north end of the PRLA and establishing a full buffer strip would have reduced the impacts to water and wildlife resources. This would be possible because the overburden and topsoil storage areas and actual coal excavation would not have destroyed the headwater areas of James Creek during the first few years of operation. This mitigative measure would also have

reduced the impacts on wildlife since the PRLA's water supply and associated forage and cover would remain unaffected for a longer period.

This alternative was shown to be unworkable because of the increased depth to coal on the north end in conjunction with the added expense of mine development during the early years of mine operations.

Designing Specific Pit Configurations

Slanting the pit bottom in preselected areas in the headwater areas of James Creek to assist in directing groundwater from the spoils area toward the headwaters of James Creek would have assisted groundwater movement into James Creek. However, this process was not technically feasible.

CHAPTER 4—CONSULTATION AND COORDINATION

CHAPTER 4—CONSULTATION AND COORDINATION

STATE AGENCIES

As required by 36 CFR 60.4 and 36 CFR 800, BLM has consulted with the Colorado State Historical Society concerning the proposed PRLA.

The Colorado Historical Society's letter of April 3, 1985, requested the following stipulations:

1. A Class III cultural resource inventory will be conducted on all areas that will be disturbed. This excludes those areas previously inventoried at this level.
2. Determinations of significance and effect will be conducted per 36 CFR 60.4 and 36 CFR 800.
3. A written report will be prepared on the results of the above two measures and will include a treatment plan for the eligible cultural resources.

FEDERAL AGENCIES

BLM consulted with the following Federal agencies:

1. U.S. Fish and Wildlife Service (USFWS) on threatened and endangered species and raptors. The results of that consultation are still pending; however, BLM specialists do not anticipate any significant impacts to these species based on information now available. It is the policy of the USFWS, as relayed to BLM, that any unmitigated depletion in flow in the Upper Colorado River system may jeopardize threatened and endangered fish species. This includes depletions of less than one cubic foot per second.

   Consultation will be completed during the mine permitting process when more specifics on the proposed development are known.
2. Colorado Mined Land Reclamation Division on the proposed mine development scenario.
3. Office of Surface Mining on determination of alluvial valley floors.

BLM has also been working closely with the Colorado Division of Wildlife (CDOW) to mitigate impacts to wildlife and has discussed areas of concern with the Rio Blanco County commissioners and the Moffat County Planning Department. The position of the CDOW is presented in figure 4-1.

LIST OF PREPARERS

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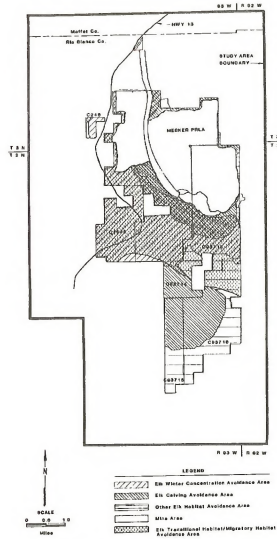

Figure 3-1 Impact Avoidance Areas Within the Meeker PRLA and Federal Coal Leases held by Consol.

3-2

STATE OF COLORADO
Richard D. Lamm, Governor
DEPARTMENT OF NATURAL RESOURCES

DIVISION OF WILDLIFE

James B. Ruch, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192

July 11, 1985

Mr. Kannon Richards
State Director (Co-934)
Bureau of Land Management
Colorado State Office
2020 Arapahoe Street
Oenver, CO 80205

Oear Mr. Richards:

The Division of Wildlife has taken a position on unsuitability criterion 15 for P.R.L.A. C0126998 north of Meeker, Colorado. This position has been arrived at af... considerable data gathering, analysis, and commitments to mitigation by Consolidation Coal Company.

Enclosed is a map titled figure 3-1. It is from Consols Mitigation Feasibility Assessment and Mitigation plan. Currently some of the area shown as avoidance areas are unsuitable. It is our recommendation that all of the areas shown, except those shaded as mine area be designated unsuitable. It is also recommended that the mitigation committed to by Consol in the above referenced document become stipulations of the lease if it is issued.

It is important to realize that the PRLA is very important wildlife habitat. If Consol had not made some major commitments to wildlife our position would be very different. Any deviation from this recommendation would force us to reconsider the unsuitability of the entire area.

Sincerely,

Jim Ruch
Director

JR:JM:ch

Enc. 1

Fig 4-1 Colorado Division of Wildlife Position Letter

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APPENDICES

APPENDIX A
UNSUITABILITY ANALYSIS

Regulations for coal management given in 43 CFR 3461 require the BLM to apply 20 unsuitability criteria to lands considered for lease for coal mining operations. If any of the criteria are found applicable, affected portions of the lease are declared unsuitable for all or certain methods of surface coal mining activity. If impacts to land values addressed in each criterion could be avoided or satisfactorily ameliorated through lease stipulation, the unsuitability designation would be rescinded. Exceptions described in each criterion's definition found in 43 CFR 3460, if applicable, preempt unsuitability analysis or designation. A copy of 43 CFR 3460 is found at the end of Appendix A. The criteria were applied to the PRLA and although none of them would absolutely prevent mining, five of them would require that mitigative measures be applied before the tract could be found suitable.

A brief summary of the five applicable criteria follows:

1. Two public roads bisect the PRLA; all lands within 100 feet of the right-of-way are unsuitable under this criteria.

2. There is a series of rock alignments that require test excavation in order to determine their eligibility to the National Register. Suitability under this criterion can only be determined for those sites on or eligible to be on the National Register of Historic Places. A determination has not been made and can only be applied when all cultural resources are known.

3. The PRLA is composed of an important aggregation of habitats considered to be crucial in maintaining present characteristics of the main White River elk herd.

   Criterion #15 (Fish and Wildlife Habitat) does not preclude mining; however, mitigation must be applied.

4. If loadout facilities and/or transportation facilities were located within the 100-year floodplain boundary, the operator would be required, and in fact, Consol has proposed, to install appropriate flood control measures for the control of runoff and sediment.

5. Criterion #19 (Alluvial Valley Floors) would require mitigation designed to protect the water supply systems to the significant agricultural land in James Creek and Good Spring Creek at the time of the mine plan. Determination of significance will be performed by OSM at the mine permit stage.

A detailed description of the application of each of the 20 unsuitability criteria follows:

Criterion 1: Federal Land Systems

None of the Federal land systems were found on the application area. Therefore, the area was not considered to be unsuitable.

Criterion 2: Rights-of-Way and Easements

Field examination and consultation with district and area staff indicates that no rights-of-way, easements, surface leases, or agricultural crop production (on federally owned surface) occur on the area. The criterion is, thus, not applicable.

Criterion 3: Buffer Zones

State Highway 13 and Rio Blanco County Road 30 bisect the PRLA boundary. All lands within 100 feet of the outside line of the right-of-way are considered unsuitable. The residence is not occupied and therefore not unsuitable.

Criterion 4: Wilderness Study Areas

No lands have been designated as wilderness study areas within or adjacent to the application area.

Criterion 5: Scenic Areas

No Class I scenic areas have been identified within or adjacent to the application area.

Criterion 6: Lands Used for Scientific Studies

Camp, Dresser, and McKee are currently conducting elk studies in the area for Consol, in relation to the Consol PRLA proposal. Development should not be constrained under this criterion.

Criterion 7: Historic Lands and Sites

Approximately 866 acres have been inventoried at the Class III level and 11 cultural resources have been recorded on the tract. Nine of the sites have been evaluated for inclusion on the National Register of Historic Places. Three sites have been recommeded as eligible, based on field evaluation.

Criterion 8: Natural Areas

No lands have been designated or proposed for designation as Natural Areas or as National Natural Landmarks within the area of study.

Criterion 9: Federally Listed Endangered Species

There are no areas of critical habitat identified for federally listed threatened and endangered (T/E) species in the immediate PRLA area.

The endangered bald eagle occasionally forages over these upland areas from winter roosting sites along the White River, 5 miles south of the tract. BLM, Fish and Wildlife Service, and the Colorado Division of Wildlife have consulted and agreed that bald eagle, or its habitat, would not be adversely affected by lease development.

Development on the PRLA could indirectly affect threatened and endangered fish populations inhabiting the distant Yampa (Colorado River squawfish, humpback chub) and White (Colorado River squawfish) rivers, because of their tributary relationships with local PRLA drainages (i.e., Curtis and Good Spring creeks, which eventually complement the White and Yampa rivers).

The predominant concern in the protection of these endemic fishes, especially spawning requirements, is the continued maintenance of contributory flows (quantity of water) to the White and Yampa rivers and the preservation of these rivers' flow periodicity (high/low water schedules). After consultation with the Fish and Wildlife Service in 1982, it was decided that unsuitability designation was unwarranted for this criterion.

No threatened or endangered plant species are known to occur on the site.

Criterion 10: State Listed Threatened or Endangered Species

The state threatened and endangered species list conforms to the Federal listing with the exception of the razorback sucker, which inhabits the Yampa River.

The previous narrative pertaining to federally listed endangered species (Criterion 9) is equivalent to this criterion.

After consultation with the Colorado Division of Wildlife, it was determined that no state listed animal species, or their habitats, would be adversely affected by lease development.

No state listed threatened or endangered plant species are known to occur on the PRLA.

Criterion 11: Bald and Golden Eagle Nests

No eagle nests are within or adjacent to the application boundary.

Criterion 12: Bald and Golden Eagle Roost and Concentration Areas

No eagle roosts or concentration areas are within or adjacent to the application boundary.

Criterion 13: Falcon Cliff Nesting Sites

No falcon cliff nesting sites occur on the PRLA.

Criterion 14: Migratory Birds

No high-priority habitat areas for migratory bird species are known to occur.

Criterion 15: State Resident Fish and Wildlife Habitat

Consol's commitment to off-site enhancement and avoiding the avoidance areas diagramed in figure 3-1 (CDM's Elk Mitigation Feasibility Assessment and Mitigation Plan, located in Appendix D) would be sufficient mitigation to remove the wildlife unsuitability criteria from the proposed mine area as illustrated in figure 2-5 of this EIS.

Criterion 16: Floodplains

BLM regulations require identification of floodplains (based on a 24-hour precipitation event with a 100-year recurrence interval) on which mining could not be undertaken without substantial threat of loss of life or property (43 CFR 3461.1, 1984).

If loadout facilities and/or transportation facilities were located within the 100-year floodplain boundary, the operator would be required, and in fact Consol has proposed, to install appropriate flood control measures for the control of runoff and sediment. As proposed, no actual coal excavation activities would take place within the 100-year floodplain. Care should be exercised in designing flood control measures to ensure protection of Highway 13/789 and the ranch property located approximately ¾ mile downsteam from James Creek and the Good Spring Creek confluence.

Criterion 17: Municipal Watersheds

No municipal watersheds have been identified within the potential coal lease area.

Criterion 18: National Resource Waters

To date, no water courses in the area have been officially designated as National Resource Waters in completed water quality management plans.

Because the areas under review have not officially been designated, they were considered suitable.

Criterion 19: Alluvial Valley Floors (AVFs)

BLM and CMLRD regulations require identification of alluvial valley floors (AVFs) that may be affected by mining based on guidelines published by OSM and CMLRD (43 CFR 3461.1 (1984), OSM (1983), CMLRD (1980)). This will be done through consulta-

tion with the appropriate agency in the state of Colorado.

Preliminary AVF classifications are recommended for the specially managed subirrigated lands in sections 15 and 22 of T. 3 N., R. 93 W., and section 9, T. 2 N., R. 93 W., all of which are located outside of the study area. The land in section 9, T. 2 N., R. 93 W., will not be impacted from the proposed mine operation. The AVFs in sections 15 and 22 of T. 3 N., R. 93 W., may be impacted from reduced flows and elevated levels of total dissolved solids. Actual determinations will be made by OSM during the mine permitting process when more detailed site-specific information is available. At this time, no AVFs are known to occur within the PRLA boundaries.

Criterion 20: State Proposed Criteria

To date, the state has furnished no information, but has expressed interest in reviewing coal activity on a site-specific basis in the future. Therefore, this criterion was not applied to the project area.

43 CFR

The specific regulations used to guide the unsuitability determination for the James Creek PRLA EIS follow.

PART 3460—ENVIRONMENT

Subpart 3461—Federal Lands Review—Unsuitability for Mining

Sec.
3461.0-3 Authority.
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3461.2 Underground mining exemption from criteria.
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3461.4 Relationship of leasing to unsuitability assessment.
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3461.4-2 Application of criteria on leased lands.
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Subpart 3465—Surface Management and Protection

3465.0-1 Purpose.
3465.0-3 Authority.
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3465.1 Use of surface.
3465.2 Inspections and noncompliance.
3465.2-1 Inspections.
3465.2-2 Discovery of noncompliance.
3465.2-3 Failure of lessee or holder of license to mine to act.

AUTHORITY: 30 U.S.C. 181 *et seq.*; 30 U.S.C. 351-359; 30 U.S.C. 521-531; 30 U.S.C. 1201 *et seq.*; and 43 U.S.C. 1701 *et seq.*, unless otherwise noted.

SOURCE: 44 FR 42638, July 19, 1979, unless otherwise noted.

Subpart 3461—Federal Lands Review—Unsuitability for Mining

§ 3461.0-3 Authority.

(a) These regulations are issued under the authority of the statutes listed in § 3400.0-3 of this title.

(b) These regulations primarily implement:

(1) The general unsuitability criteria in section 522(a) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(a));

(2) The Federal lands review in section 522(b) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(b)); and

(3) The prohibitions against mining certain lands in section 522(e) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(e)).

§ 3461.0-6 Policy.

The Department shall carry out the review of Federal lands under section 522(b) of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272(b)) principally through land use planning assessments by the surface management agency regarding the unsuitability of Federal lands for all or certain stipulated methods of coal mining.

§ 3461.0-7 Scope.

Each criterion in § 3461.1 of this title uses the phrase "shall be considered unsuitable" as shorthand for "shall be considered unsuitable for all or certain stipulated methods of coal mining involving surface coal mining operations, as defined in § 3400.0-5(mm) of this title.

[44 FR 42638, July 19, 1979, as amended at 47 FR 33148, July 30, 1982]

§ 3461.1 Criteria for assessing lands unsuitable for all or certain stipulated methods of coal mining.

(a)(1) *Criterion Number 1.* All Federal lands included in the following land systems or categories shall be considered unsuitable: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund, National Forests, and Federal lands in incorporated cities, towns, and villages.

(2) *Exceptions.* (i) A lease may be issued within the boundaries of any National Forest if the Secretary finds no significant recreational, timber, economic or other values which may be incompatible with the lease; and (A) surface operations and impacts are incident to an underground coal mine, or (B) where the Secretary of Agriculture determines, with respect to lands which do not have significant forest cover within those National Forests west of the 100th Meridian, that surface mining may be in compliance with the Multiple-Use Sustained-Yield Act of 1960, the Federal Coal Leasing Amendments Act of 1976 and the Surface Mining Control and Reclamation Act of 1977.

(ii) A lease may be issued within the Custer National Forest with the consent of the Department of Agriculture as long as no surface coal mining operations are permitted.

(3) *Exemptions.* The application of this criterion to lands within the listed land systems and categories is subject to valid existing rights, and does not apply to surface coal mining operations existing on August 3, 1977. The application of the portion of this criterion applying to land proposed for inclusion in the listed systems does not apply to lands: To which substantial legal and financial commitments were made prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(b)(1) *Criterion Number 2.* Federal lands that are within rights-of-way or easements or within surface leases for residential, commercial, industrial, or other public purposes, on federally

owned surface shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued, and mining operations approved, in such areas if the surface management agency determines that:

(i) All or certain types of coal development (e.g., underground mining) will not interfere with the purpose of the right-of-way or easement; or

(ii) The right-of-way or easement was granted for mining purposes; or

(iii) The right-of-way or easement was issued for a purpose for which it is not being used; or

(iv) The parties involved in the right-of-way or easement agree, in writing, to leasing; or

(v) It is impractical to exclude such areas due to the location of coal and method of mining and such areas or uses can be protected through appropriate stipulations.

(3) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(c)(1) *Criterion Number 3.* Federal lands affected by section 522(e) (4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes lands within 100 feet of the outside line of the right-of-way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community or institutional building or public park or within 300 feet of an occupied dwelling.

(2) *Exceptions.* A lease may be issued for lands:

(i) Used as mine access roads or haulage roads that join the right-of-way for a public road;

(ii) For which the Office of Surface Mining Reclamation and Enforcement has issued a permit to have public roads relocated;

(iii) If, after public notice and opportunity for public hearing in the locality, a written finding is made by the authorized officer that the interests of the public and the landowners affected by mining within 100 feet of a public road will be protected.

(iv) For which owners of occupied dwellings have given written permission to mine within 300 feet of their buildings.

(3) *Exemptions.* The application of this criterion is subject to valid existing rights, and does not apply to surface coal mining operations existing on August 3, 1977.

(d)(1) *Criterion Number 4.* Federal lands designated as wilderness study areas shall be considered unsuitable while under review by the Administration and the Congress for possible wilderness designation. For any Federal land which is to be leased or mined prior to completion of the wilderness inventory by the surface management agency, the environmental assessment or impact statement on the lease sale or mine plan shall consider whether the land possesses the characteristics of a wilderness study area. If the finding is affirmative, the land shall be considered unsuitable, unless issuance of noncompetitive coal leases and mining on leases is authorized under the Wilderness Act and the Federal Land Policy and Management Act of 1976.

(2) *Exemption.* The application of this criterion to lands for which the Bureau of Land Management is the surface management agency and lands in designated wilderness areas in National Forests is subject to valid existing rights.

(e)(1) *Criterion Number 5.* Scenic Federal lands designated by visual resource management analysis as Class I (an area of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable. A lease may be issued if the surface management agency determines that surface coal mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.

(2) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(f)(1) *Criterion Number 6.* Federal lands under permit by the surface management agency, and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.

(2) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(g)(1) *Criterion Number 7.* All publicly owned places on Federal lands which are included in the National Register of Historic Places shall be considered unsuitable. This shall include any areas that the surface management agency determines, after consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Officer, are necessary to protect the inherent values of the property that made it eligible for listing in the National Register.

(2) *Exceptions.* All or certain stipulated methods of coal mining may be allowed if, after consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Officer, they are approved by the surface management agency, and, where appropriate, the State or local agency with jurisdiction over the historic site.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(h)(1) *Criterion Number 8.* Federal lands designated as natural areas or as National Natural Landmarks shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued and mining operation approved in an area or site if the surface management agency determines that:

(i) With the concurrence of the state, the area or site is of regional or local significance only;

(ii) The use of appropriate stipulated mining technology will result in no significant adverse impact to the area or site; or

(iii) The mining of the coal resource under appropriate stipulations will enhance information recovery (e.g., paleontological sites).

(3) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which includes operations on which a permit has been issued.

(i) (1) *Criterion Number 9.* Federally designated critical habitat for threatened or endangered plant and animal species, and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if, after consultation with the Fish and Wildlife Service, the Service determines that the proposed activity is not likely to jeopardize the continued ex-

istence of the listed species and/or its critical habitat.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(j)(1) *Criterion Number 10.* Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable.

(2) *Exception.* A lease may be issued and mining operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining.

(3) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(k)(1) *Criterion Number 11.* A bald or golden eagle nest or site on Federal lands that is determined to be active and an appropriate buffer zone of land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

(2) *Exceptions.* A lease may be issued if:

(i) It can be conditioned in such a way, either in manner or period of operation, that eagles will not be disturbed during breeding season; or

(ii) The surface management agency, with the concurrence of the Fish and Wildlife Service, determines that the golden eagle nest(s) will be moved.

(iii) Buffer zones may be decreased if the surface management agency determines that the active eagle nests will not be adversely affected.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(l)(1) *Criterion Number 12.* Bald and golden eagle roost and concentration areas on Federal lands used during migration and wintering shall be considered unsuitable.

(2) *Exception.* A lease may be issued if the surface management agency determines that all or certain stipulated methods of coal mining can be conducted in such a way, and during such periods of time, to ensure that eagles shall not be adversely disturbed.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(m)(1) *Criterion Number 13.* Federal lands containing a falcon (excluding kestrel) cliff nesting site with an active nest and a buffer zone of Federal land around the nest site shall be considered unsuitable. Consideration of availability of habitat for prey species and of terrain shall be included in the determination of buffer zones. Buffer zones shall be determined in consultation with the Fish and Wildlife Service.

(2) *Exception.* A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the falcon habitat during the periods when such habitat is used by the falcons.

(3) *Exemptions.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(n)(1) *Criterion Number 14.* Federal lands which are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and the Fish and Wildlife Service, shall be considered unsuitable.

(2) *Exception.* A lease may be issued where the surface management agency, after consultation with the Fish and Wildlife Service, determines that all or certain stipulated methods of coal mining will not adversely affect the migratory bird habitat during the periods when such habitat is used by the species.

(3) *Exemption.* This criterion does not apply to lands: to which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(o)(1) *Criterion Number 15.* Federal lands which the surface management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Examples of such lands which serve a critical function for the species involved include:

(i) Active dancing and strutting grounds for sage grouse, sharp-tailed grouse, and prairie chicken;

(ii) Winter ranges most critical for deer, antelope, and elk; and

(iii) Migration corridors for elk.

A lease may be issued if, after consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not have a significant long-term impact on the species being protected.

(2) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(p)(1) *Criterion Number 16.* Federal lands in riverine, coastal and special floodplains (100-year recurrence interval) on which the surface management agency determines that mining could not be undertaken without substantial threat of loss of life or property shall be considered unsuitable for all or certain stipulated methods of coal mining.

(2) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(q)(1) *Criterion Number 17.* Federal lands which have been committed by the surface management agency to use as municipal watersheds shall be considered unsuitable.

(2) *Exception.* A lease may be issued where the surface management agency in consultation with the municipality (incorporated entity) or the responsible governmental unit determines, as a result of studies, that all or certain stipulated methods of coal mining will not adversely affect the watershed to any significant degree.

(3) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(r)(1) *Criterion Number 18.* Federal lands with National Resource Waters,

as identified by states in their water quality management plans, and a buffer zone of Federal lands ¼ mile from the outer edge of the far banks of the water, shall be unsuitable.

(2) *Exception.* The buffer zone may be eliminated or reduced in size where the surface management agency determines that it is not necessary to protect the National Resource Waters.

(3) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

(s)(1) *Criterion Number 19.* Federal lands identified by the surface management agency, in consultation with the state in which they are located, as alluvial valley floors according to the definition in § 3400.0-5(a) of this title, the standards in 30 CFR Part 822, the final alluvial valley floor guidelines of the Office of Surface Mining Reclamation and Enforcement when published, and approved state programs under the Surface Mining Control and Reclamation Act of 1977, where mining would interrupt, discontinue, or preclude farming, shall be considered unsuitable. Additionally, when mining Federal land outside an alluvial valley floor would materially damage the quantity or quality of water in surface or underground water systems that would supply alluvial valley floors, the land shall be considered unsuitable.

(2) *Exemptions.* This criterion does not apply to surface coal mining operations which produced coal in commercial quantities in the year preceding August 3, 1977, or which had obtained a permit to conduct surface coal mining operations.

(t)(1) *Criterion Number 20.* Federal lands in a state to which is applicable a criterion (i) proposed by that state, and (ii) adopted by rulemaking by the Secretary, shall be considered unsuitable.

(2) *Exceptions.* A lease may be issued when:

(i) Such criterion is adopted by the Secretary less than 6 months prior to the publication of the draft comprehensive land use plan or land use analysis, plan, or supplement to a comprehensive land use plan, for the area in which such land is included, or

(ii) After consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not adversely affect the value which the criterion would protect.

(3) *Exemptions.* This criterion does not apply to lands: To which the operator made substantial legal and financial commitments prior to January 4, 1977; on which surface coal mining operations were being conducted on August 3, 1977; or which include operations on which a permit has been issued.

[44 FR 42638, July 19, 1979, as amended at 47 FR 33148, July 30, 1982; 48 FR 54820, Dec. 7, 1983]

§ 3461.2 Underground mining exemption from criteria.

(a) Federal lands with coal deposits that would be mined by underground mining methods shall not be assessed as unsuitable where there would be no surface coal mining operations, as defined in § 3400.0-5 of this title, on any lease, if issued.

(b) Where underground mining will include surface operations and surface impacts on Federal lands to which a criterion applies, the lands shall be assessed as unsuitable unless the surface management agency finds that a relevant exception or exemption applies.

[44 FR 42638, July 19, 1979, as amended at 47 FR 33149, July 30, 1982]

§ 3461.3 Unsuitability assessment procedures.

§ 3461.3-1 Assessment and land use planning.

(a)(1) Each of the unsuitability criteria shall be applied to all coal lands with development potential identified in the comprehensive land use plan or land use analysis. For areas where 1 or more unsuitability conditions are found and for which the authorized officer of the surface management agency could otherwise regard coal mining as a likely use, the exceptions and exemptions for each criterion may be applied.

(2) The authorized officer of the surface management agency shall describe in the comprehensive land use plan or land use analysis the results of the application of each unsuitability criterion, exception and exemption. The authorized officer of the surface management agency shall state in the plan or analysis those areas which could be leased only subject to conditions or stipulations to conform to the application of the criteria or exceptions. Such areas may ultimately be leased provided that these conditions or stipulations are contained in the lease.

(b)(1) The authorized officer shall make his assessment on the best available data that can be obtained given the time and resources available to prepare the plan. The comprehensive land use plan or land use analysis shall include an indication of the adequacy and reliability of the data involved. Where either a criterion or exception (when under paragraph (a) of this section the authorized officer decides that application of an exception is appropriate) cannot be applied during the land use planning process because of inadequate or unreliable data, the plan or analysis shall discuss the reasons therefor and disclose when activity planning, or, in the case of criterion 19, prior to approval of a permit, the data needed to make an assessment with reasonable certainty would be generated. The authorized officer shall make every effort within the time and resources available to collect adequate and reliable data which would permit the application of criterion 19 in the land use or activity planning process. When those data are obtained, the authorized officer shall make public his assessment on the application of the criterion or, if appropriate, the exception and the reasons therefor and allow opportunity for public comment.

(2) No lease tract shall be analyzed in a final regional lease sale environmental impact statement prepared under § 3420.4-5 of this title without significant data material to the application to the tract of each criterion described in § 3461.1 of this title, except, where necessary, criterion 19. If the data are lacking for the application of a criterion or exception to only a portion of the tract, and if the authorized officer determines that it is likely that stipulations in the lease or permit to conduct surface coal mining operations could avoid any problems which may result from subsequent application of the criterion or exception, such tract may be included and analyzed in the regional lease sale environmental impact statement.

(c) Any unsuitability assessments which result either from a designation or a termination of a designation of Federal lands as unsuitable by the Office of Surface Mining Reclamation and Enforcement, or from changes warranted by additional data acquired in the activity planning process, may be made without formally revising or amending the comprehensive land use plan or analysis.

[44 FR 42638, July 19, 1979, as amended at 47 FR 33149, July 30, 1982]

§ 3461.3-2 Consultation on unsuitability assessments.

(a) Prior to adopting a comprehensive land use plan or land use analysis which assesses Federal lands as unsuitable for coal mining, the Secretary or other surface management agency shall complete the consultation set out in §§ 3420.1-6 and 3420.1-7 of this title.

(b) When consultation or concurrence is required in the application of any criterion or exception in § 3461.1 of this title, the request for advice or concurrence, and the reply thereto, shall be in writing. Unless another period is provided by law, the authorized officer shall specify that the requested advice, concurrence or non-

concurrence be made within 30 days.

(c) When the authorized officer does not receive a response either to a request for concurrence which is required by this subpart but not by law, or to consultation within the specified time, he or she may proceed as though concurrence had been given or consultation had occurred.

[44 FR 42638, July 19, 1979, as amended at 47 FR 33149, July 30, 1982]

§ 3461.4 Relationship of leasing to unsuitability assessment.

§ 3461.4–1 Application of criteria on unleased lands.

(a) The unsuitability criteria shall only be applied, prior to lease issuance, to all lands leased after July 19, 1979.

(b) The unsuitability criteria shall be initially applied either:

(1) During land use planning or the environmental assessment conducted for a specific lease application; or

(2) During land use planning under the provisions of § 3420.1–4 of this title.

[47 FR 33149, July 30, 1982]

§ 3461.4–2 Application of criteria on leased lands.

The unsuitability criteria shall not be applied to leased lands.

[47 FR 33149, July 30, 1982]

§ 3461.5 Exploration.

(a) Assessment of any area as unsuitable for all or certain stipulated methods of coal mining operations pursuant to section 522 of the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1272) and the regulations of this subpart does not prohibit exploration of such area under Subpart 3410 of this title and under 43 CFR 3481.3(a).

(b) An application for an exploration license on any lands assessed as unsuitable for all or certain stipulated methods of coal mining shall be reviewed by the Bureau of Land Management to ensure that exploration does not harm any value for which the area has been assessed as unsuitable.

[44 FR 42638, July 19, 1979. Redesignated and amended at 47 FR 33149, July 30, 1982]

APPENDIX B
LAWS AND AGENCIES MITIGATING COAL RELATED IMPACTS

Laws and Agencies Mitigating Coal-Related Impacts

Law—Agency	*Purpose*	*Major Relevance*
Mineral Leasing Act of 1920 (MLA)	Changed policy from selling coal lands to the leasing of coal lands. Rights to explore, develop, and remove coal were acquired though a lease issued by BLM. Act gave Secretary of Interior authority for stipulation for Federal coal leases.	Act gave Secretary of Interior authority for formulating and including stipulations for Federal coal leases.
Federal Coal Leasing Amendments Act of 1976 (FCLAA)	To provide a more orderly procedure for the leasing and development of coal presently owned by the United States.	Act ratified the BLM practice of preparing land-use plans before issuing competitive coal leases.
Federal Land Policy and Management Act of 1976 (FLPMA)	Provides a comprehensive statutory statement of purposes, goals, and authority for the use and management of federally owned land administered by the Secretary of Interior through the BLM.	Title II of this Act provides BLM with a statutory mandate for land-use planning for public lands. Land-use plans must address: • principles of multiple use and sustained yield. • give priority to the protection of areas of critical environmental concern. • consider present and future use of public lands. • coordinate planning with that of Federal, state, and local agencies.
American Indian Religious Freedom Act of 1978	Establish policy to protect and preserve the right of American Indians to exercise their traditional religions.	Ensures that traditional native religions have the same religious freedom as other religions.
Mineral Leasing Act for Acquired Lands 1947	Governs leasing on federally acquired land for coal and other minerals covered by the Mineral Leasing Act of 1920.	This Act requires consent of the Federal agency having surface management of the land before BLM can lease the land for coal. Otherwise, leasing and operations provisions are the same as those for nonacquired lands.
Surface Mining Control and Reclamation Act of 1977 (SMCRA)	Established a detailed national program for regulating surface coal mining and reclamation.	Act requires that surface coal mining be conducted in accordance with environmental protection performance standards and that Federal lands be reviewed to determine their suitability for all or certain types of surface mining, either as a part of land-use planning at the Federal, state, and local levels, or as a result of an unsuitability petition.
Antiquities Act of 1906	Regulates antiquities excavation and collection (including fossil remains). Protects historical values on public land.	Mitigates potential harm to historical, archaeological, and paleontological resources.
Archaeological and Historical Preservation Act of 1974	Provides for recovery of archaeological and historical data endangered by Federal or federally related activity, permit or license.	Mandates archaeological and historical data recovery with Federal or or federally related activity, activities or programs, and authorizes construction related funding.
Bald Eagle Protection Act of 1969, as amended	Protects bald and golden eagles.	May make certain coal lands off-limits for development.
Clean Air Act, as amended	Establishes requirements for areas failing to attain National Ambient Air Quality Standards (NAAQS). Provides for prevention of significant deterioration of areas where air is cleaner than NAAQS.	Limits industrial development within and adjacent to areas exceeding NAAQS and areas preserving clean air quality.

Laws and Agencies Mitigating Coal-Related Impacts (continued)

Law—Agency	*Purpose*	*Major Relevance*
Clean Water Act of 1977	Establishes effluent limitations for new and existing industrial discharges into U.S. waters.	May reduce development options in areas where antidegradation policy restricts discharges into high-quality waters.
	Limitations set for public treatment discharges, with pretreatment by industrial users.	Treatment facilities in areas with rapidly expanding infrastructures must meet water quality standards.
	Provides mechanism to restore and maintain integrity of the nation's waters.	Effluent standards apply to coal mining point sources.
Endangered Species Act of 1973, as amended	Protects endangered and threatened species and critical habitat from Federal activities. Requires prior consultation with U.S. Fish and Wildlife Service.	May make certain coal lands unsuitable for development.
Fish and Wildlife Coordination Act of 1934	Requires consultation about water resource development actions that might affect fish or associated wildlife resources.	Mitigates potential Federal coal development impacts.
National Historic Preservation Act of 1966, as amended	Establishes a system of evaluating the significance of cultural resources and creates a President's Advisory Council on Historic Preservation.	Requires Federal agencies to provide for the protection of cultural resources listed in, or eligible for, the National Register of Historic Places, and requires agency consultation with the Advisory Council prior to authorizing, licensing, or funding a project that may impact cultural resources.
National Environmental Policy Act of 1969 (NEPA)	Makes environmental protection part of the mandate of every Federal agency.	Provides legislative authority to control energy development on environmental grounds.
	Requires impact statements for major Federal actions with potentially significant impacts.	Impact statement process must be integral part of coal leasing system.
Mining and Minerals Policy Act of 1970	Declares congressional minerals policy.	Provides broad, general principles for mineral resource development.
Noise Control Act of 1972	Requires publication of information on limits of noise required to protect public health and welfare.	Regulations may be proposed to control coal mining areas and activities.
	Preempts local control of railroad equipment and yard noise emissions.	
Resource Conservation and Recovery Act of 1976	Establishes guidelines for collection, transport, separation, recovery, and disposal of solid waste.	Mining locations may be affected by EPA regulations governing disposal of coal mining wastes.
Safe Drinking Water Act of 1977	Establishes mechanism for National Primary Drinking Water Standards.	EPA conducting study of the impacts of pits, ponds, lagoons, etc., on underground water supplies for public water systems.
Soil and Water Resources Conservation Act of 1977	Requires appraisal by Secretary of Agriculture of information and expertise on conservation and use of soils, plants, woodlands, etc.	Provides opportunity for expanded data base.
Multiple-Use Sustained Yield Act of 1960	Requires management of national forests under principles of multiple use so as to produce a sustained yield of products and services.	Mandates land management principles similar to those required by FLPMA.
National Forests Management Act of 1976	Provides for a comprehensive system of land and resource management planning for National Forest System lands.	Key factor in the Department of the Interior's determination of where coal leasing would occur.
Forests and Rangeland Resources Planning Act of 1974	Provides for a comprehensive system of land and resource management planning for National Forest System lands.	Key factor in the Department of the Interior's determination of where coal leasing would occur.
Archaeological Resource Protection Act of 1979	Provides major penalties and a specific definition of archaeological resources.	Updates and expands protection of archaeological and historical resources beyond that provided for in the Antiquities Act of 1906.

Laws and Agencies Mitigating Coal-Related Impacts (concluded)

Law—Agency	*Purpose*	*Major Relevance*
Department of Energy Organization Act of 1977	Transfers authority to issue some coal regulations from DOI to DOE, including production regulations. DOE determines long-term national coal production goals.	Limits coal management authority exercised by the Department of the Interior. Requires program to establish proper coordination mechanisms.
Restriction of Mining in National Parks, Act of September 28, 1976 (P.L. 94-429)	Provides for the regulation of mining activity within, and to repeal the application of mining laws in, areas of the National Park System.	Requires recognition and protection of nationally significant natural areas as they relate to surface mining.
Colorado Department of Health		
• Water Quality Control Committee	Establishes and administers water quality standards in state waters.	Requires site review and permit issuance for projects involving water, sewage, and waste disposal. Establishes criteria for erosion control dams.
• Air Quality Control Commission	Establishes and administers air quality standards.	Requires mines to use dust preventative measures in all mining procedures, including construction.
• State Land Use Committee	Protects the utility, value, and future of all lands within the state, including the public domain and privately owned land. Provides for the protection of historical, natural, or archaeological values and for data recovery.	Local governments have the duty to identify, designate, and administer such areas and activities of state interest, including mineral resource areas and mining. Establishes areas containing or having significant impacts on historical, natural, or archaeological resources as being of state interest. BLM must coordinate with State Historic Preservation Officer before approving mining plans or rights-of-way.
Colorado Department of Natural Resources		
• Division of Mines	Provides for mine safety.	Monitors mine safety practices.
• Mined Land Reclamation	Provides for the reclamation of land subjected to surface disturbance by mining, thereby conserving natural resources, protecting wildlife and aquatic resources, and establishing recreation, home, and industrial sites to protect and perpetuate the taxable value of property. Mitigates impacts, assures reclamation, perpetuates existing regulations, and ensures that Colorado can carry out the intent and purposes of SMCRA.	Mine operator must obtain a permit. A plan of operations must be submitted, which includes a reclamation section. The board must hold public hearings and the involved county must approve issuance of a permit. Provides strict time frames for administering permitting provisions. Performance standards require restoring disturbed lands to a condition equal to or better than before mining, returning disturbed lands to the approximate original contour, stabilizing and protecting all surface areas during and after mining, reducing disturbances to the prevailing hydrologic balance, and protecting alluvial valley floors. In addition, the Colorado act applies to "surface operations and surface impacts incident to an underground coal mine." Underground operations must comply with most of the detailed performance standards for surface mines, even though special performance standards such as preventing material damage by subsidence are developed for some aspects of underground operations (Colorado Revised Statutes 1979).

APPENDIX C
COAL LEASE FORM
(PROPOSED ACTION AND PREFERRED ALTERNATIVE)

Form 3400-12
(April 1984)
(Formerly 3520-1)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Serial Number

COAL LEASE

PART I. LEASE RIGHTS GRANTED

This lease, entered into by and between the UNITED STATES OF AMERICA, hereinafter called lessor, through the Bureau of Land Management, and *(Name and Address)*

Consolidation Coal Company
Consol Plaza
Pittsburgh, Penn. 15241

hereinafter called lessee, is effective *(date)* , for a period of 20 years and for so long thereafter as coal is produced in commercial quantities from the leased lands, subject to readjustment of lease terms at the end of the 20th lease year and each 10-year period thereafter.

Sec. 1. This lease is issued pursuant and subject to the terms and provisions of the:

☐ Mineral Lands Leasing Act of 1920, Act of February 25, 1920, as amended, 41 Stat. 437, 30 U.S.C. 181-287, hereinafter referred to as the Act;

☐ Mineral Leasing Act for Acquired Lands, Act of August 7, 1947, 61 Stat. 913, 30 U.S.C. 351-359;

and to the regulations and formal orders of the Secretary of the Interior which are now or hereafter in force, when not inconsistent with the express and specific provisions herein.

Sec. 2. Lessor, in consideration of any bonuses, rents, and royalties to be paid, and the conditions and covenants to be observed as herein set forth, hereby grants and leases to lessee the exclusive right and privilege to drill for, mine, extract, remove, or otherwise process and dispose of the coal deposits in, upon, or under the following described lands:

T2N, R93W 6PM

Sec.2: W1/2SE1/4, SW1/4, S1/2NW1/4, SW1/4NE1/4
Lots 2,3,4
Sec.3: All
Sec.4: Lots 1,23, SE1/4
Sec.10: Lots 7,9,11,27,29, N1/2NE1/4
Sec.11: Lots 1,3,6,7,9,10, NW1/4, W1/2E1/2
Sec.14: W1/2NE1/4, W1/2
Sec.15: E1/2W1/2, E1/2

T3N, R93W, 6PM

Sec.25: S1/2SW1/4
Sec.27: S1/2
Sec.28: Lot 22, NE1/4SE1/4
Sec.33: 1,12,13,16,24,26
Sec.34: Lots 1,4 E1/2NW1/4,SW1/4, E1/2
Sec.35: All
Sec.36: W1/2

containing acres, more or less, together with the right to construct such works, buildings, plants, structures, equipment and appliances and the right to use such on-lease rights-of-way which may be necessary and convenient in the exercise of the rights and privileges granted, subject to the conditions herein provided.

PART II. TERMS AND CONDITIONS

Sec. 1. (a) RENTAL RATE - Lessee shall pay lessor rental annually and in advance for each acre or fraction thereof during the continuance of the lease at the rate of $ for each lease year.

(b) RENTAL CREDITS - Rental shall not be credited against either production or advance royalties for any year.

Sec. 2. (a) PRODUCTION ROYALTIES - The royalty shall be percent of the value of the coal as set forth in the regulations. Royalties are due to lessor the final day of the month succeeding the calendar month in which the royalty obligation accrues.

(b) ADVANCE ROYALTIES - Upon request by the lessee, the authorized officer may accept, for a total of not more than 10 years, the payment of advance royalties in lieu of continued operation, consistent with the regulations. The advance royalty shall be based on a percent of the value of a minimum number of tons determined in the manner established by the advance royalty regulations in effect at the time the lessee requests approval to pay advance royalties in lieu of continued operation.

Sec. 3. BONDS - Lessee shall maintain in the proper office a lease bond in the amount of $ The authorized officer may require an increase in this amount when additional coverage is determined appropriate.

Sec. 4. DILIGENCE - This lease is subject to the conditions of diligent development and continued operation, except that these conditions are excused when operations under the lease are interrupted by strikes, the elements, or casualties not attributable to the lessee. The lessor, in the public interest, may suspend the condition of continued operation upon payment of advance royalties in accordance with the regulations in existence at the time of the suspension. Lessee's failure to produce coal in commercial quantities at the end of 10 years shall terminate the lease. Lessee shall submit an operation and reclamation plan pursuant to Section 7 of the Act not later than 3 years after lease issuance.

The lessor reserves the power to assent to or order the suspension of the terms and conditions of this lease in accordance with, inter alia, Section 39 of the Mineral Leasing Act, 30 U.S.C. 209.

Sec. 5. LOGICAL MINING UNIT (LMU) - Either upon approval by the lessor of the lessee's application or at the direction of the lessor, this lease shall become an LMU or part of an LMU, subject to the provisions set forth in the regulations.

The stipulations established in an LMU approval in effect at the time of LMU approval will supersede the relevant inconsistent terms of this lease so long as the lease remains committed to the LMU. If the LMU of which this lease is a part is dissolved, the lease shall then be subject to the lease terms which would have been applied if the lease had not been included in an LMU.

Sec. 6. DOCUMENTS, EVIDENCE AND INSPECTION - At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing the amounts and quality of all products removed and sold from the lease, the proceeds therefrom, and the amount used for production purposes or unavoidably lost.

Lessee shall keep open at all reasonable times for the inspection of any duly authorized officer of lessor, the leased premises and all surface and underground improvements, works, machinery, ore stockpiles, equipment, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or under the leased lands.

Lessee shall allow lessor access to and copying of documents reasonably necessary to verify lessee compliance with terms and conditions of the lease.

While this lease remains in effect, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 7. DAMAGES TO PROPERTY AND CONDUCT OF OPERATIONS - Lessee shall comply at its own expense with all reasonable orders of the Secretary, respecting diligent operations, prevention of waste, and protection of other resources.

Lessee shall not conduct exploration operations, other than casual use, without an approved exploration plan. All exploration plans prior to the commencement of mining operations within an approved mining permit area shall be submitted to the authorized officer.

Lessee shall carry on all operations in accordance with approved methods and practices as provided in the operating regulations, having due regard for the prevention of injury to life, health, or property, and prevention of waste, damage or degradation to any land, air, water, cultural, biological, visual, and other resources, including mineral deposits and formations of mineral deposits not leased hereunder, and to other land uses or users. Lessee shall take measures deemed necessary by lessor to accomplish the intent of this lease term. Such measures may include, but are not limited to, modification to proposed siting or design of facilities, timing of operations, and specification of interim and final reclamation procedures. Lessor reserves to itself the right to lease, sell, or otherwise dispose of the surface or other mineral deposits in the lands and the right to continue existing uses and to authorize future uses upon or in the leased lands, including issuing leases for mineral deposits not covered hereunder and approving easements or rights-of-way. Lessor shall condition such uses to prevent unnecessary or unreasonable interference with rights of lessee as may be consistent with concepts of multiple use and multiple mineral development.

Sec. 8. PROTECTION OF DIVERSE INTERESTS, AND EQUAL OPPORTUNITY - Lessee shall: pay when due all taxes legally assessed and levied under the laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; restrict the workday to not more than 8 hours in any one day for underground workers, except in emergencies; and take measures necessary to protect the health and safety of the public. No person under the age of 16 years shall be employed in any mine below the surface. To the extent that laws of the State in which the lands are situated are more restrictive than the provisions in this paragraph, then the State laws apply.

Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 9. (a) TRANSFERS

- ☐ This lease may be transferred in whole or in part to any person, association or corporation qualified to hold such lease interest.
- ☐ This lease may be transferred in whole or in part to another public body or to a person who will mine the coal on behalf of, and for the use of, the public body or to a person who for the limited purpose of creating a security interest in favor of a lender agrees to be obligated to mine the coal on behalf of the public body.
- ☐ This lease may only be transferred in whole or in part to another small business qualified under 13 CFR 121.

Transfers of record title, working or royalty interest *must* be approved in accordance with the regulations.

(b) RELINQUISHMENT - The lessee may relinquish in writing at any time all rights under this lease or any portion thereof as provided in the regulations. Upon lessor's acceptance of the relinquishment, lessee shall be relieved of all future obligations under the lease or the relinquished portion thereof, whichever is applicable.

Sec. 10. DELIVERY OF PREMISES, REMOVAL OF MACHINERY, EQUIPMENT, ETC. - At such time as all portions of this lease are returned to lessor, lessee shall deliver up to lessor the land leased, underground timbering, and such other supports and structures necessary for the preservation of the mine workings on the leased premises or deposits and place all workings in condition for suspension or abandonment. Within 180 days thereof, lessee shall remove from the premises all other structures, machinery, equipment, tools, and materials that it elects to or as required by the authorized officer. Any such structures, machinery, equipment, tools, and materials remaining on the leased lands beyond 180 days, or approved extension thereof, shall become the property of the lessor, but lessee shall either remove any or all such property or shall continue to be liable for the cost of removal and disposal in the amount actually incurred by the lessor. If the surface is owned by third parties, lessor shall waive the requirement for removal, provided the third parties do not object to such waiver. Lessee shall, prior to the termination of bond liability or at any other time when required and in accordance with all applicable laws and regulations, reclaim all lands the surface of which has been disturbed, dispose of all debris or solid waste, repair the offsite and onsite damage caused by lessee's activity or activities incidental thereto, and reclaim access roads or trails.

Sec. 11. PROCEEDINGS IN CASE OF DEFAULT - If lessee fails to comply with applicable laws, existing regulations, or the terms, conditions and stipulations of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation by the lessor only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 12. HEIRS AND SUCCESSORS-IN-INTEREST - Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

Sec. 13. INDEMNIFICATION - Lessee shall indemnify and hold harmless the United States from any and all claims arising out of the lessee's activities and operations under this lease.

Sec. 14. SPECIAL STATUTES - This lease is subject to the Federal Water Pollution Control Act (33 U.S.C. 1151—1175), the Clean Air Act (42 U.S.C. 1857 et. seq.), and to all other applicable laws pertaining to exploration activities, mining operations and reclamation, including the Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et. seq.).

Sec. 15. SPECIAL STIPULATIONS -

In addition to observing the general obligations and standards of performance set out in the current regulations, the lessee shall comply with and be bound by the following special stipulations. These stipulations are also imposed upon the lessee's agents and employees. The failure or refusal of any of these persons to comply with these stipulations shall be deemed a failure of the lessee to comply with the terms of this lease. The lessee shall require his agents, contractors and subcontractors involved in activities concerning this lease to include these stipulations in the contracts

Section 15 Special Stipulations (Continued)

between and among them. These stipulations may be revised or amended, in writing, by the mutual consent of the lessor and the lessee at any time to adjust to changed conditions or to correct an oversight. The lessor may amend these stipulations at any time without the consent of the lessee in order to make them consistent with any new Federal or state statutes and the regulations promulgated under authority or new statutes.

All stipulations concerning compliance with the requirements of the Surface Mining Control and Reclamation Act will be included in the document approving the mining plan.

1. Wildlife

- Proposed Action

A. The lessee shall be required to mitigate for mule deer, elk, and sage grouse habitat loss where applicable and the resultant loss or displacement of these species, as key indicator species, due to surface coal mining operations. Concurrently with the filing of its mine plan, the lessee shall submit for approval to the Bureau of Land Management (BLM) a habitat recovery and replacement plan for protection or enhancement of mule deer, elk, and sage grouse populations affected by habitat loss or displacement from historical habitat. The habitat recovery and replacement plan shall include an analysis of the permit area which:

(1) Identifies the wildlife species that occupy the permit area, and

(2) Includes an analysis of the quality carrying capacity of the habitat for these species.

B. No direct surface disturbance will occur within impact avoidance elk concentration areas, elk calving areas and range suitable as winter or year-round elk habitat areas identified in figure 3-1 of the lessee's Mitigation Plan (Appendix C) as a result of Consol's proposed development. (Ninemile Gap winter and transitional ranges and a calving area south of Ninemile Gap.) For those areas shown and described in the legend of figure 3-1 of Appendix C, except for the area described as the "mine area," no surface occupancy will be allowed until such time as:

(1) The habitat removed by mining has returned to its premining value.

(2) Any disturbance is compensated for by some form of mitigation.

C. A detailed description of the methods selected by the lessee to mitigate habitat loss, together with a comparative analysis of alternate methods, which were considered and rejected by the lessee and the rationale for the decision to select the proposed methods.

D. The methods utilized by the lessee for recovery and replacement may include, but are not limited to, the following techniques:

(1) The lessee will increase the quantity and quality of forage available to wildlife.

(2) The lessee will lease, enter into formal agreements with managing agencies of public land, or purchase lands in sufficient quantity to mitigate mining impacts on a schedule that anticipates actual surface disturbance on a replacement basis satisfactory to CDOW and BLM.

(3) The lessee will purchase or lease lands suitable for enhancement as elk calving habitat.

(4) The lessee will fence primary roads and construct highway underpasses in areas identified as primary elk crossings.

E. A timetable giving the periods of time that will be required to accomplish the habitat recovery or replacement plan and showing how it relates to the overall mining plan.

F. An evaluation of the final plan by the CDOW. The state shall comment on the methods selected and the techniques to be employed by the lessee and may recommend alternate recovery or replacement methods. If the state has recommended an alternate method, the lessee shall consider the state's recommendation and, if the lessee rejects the state's plan, the lessee shall indicate its reasons as required by provision C above. If no state comment is included in the plan, the lessee shall verify its consultation with the state and the plan may be considered without state comment.

G. A monitoring program that contains the following topics and commitments will be conducted.

(1) Long-term changes in elk distribution and range use in response to mining disturbance will be monitored by means of an on-going program of elk capture and telemetry monitoring.

(2) Response of elk to habitat enhancement treatments will be monitored through comparison of levels of elk use at treatment areas versus control areas using a pellet group plot index to elk use. Radio-collared elk will be monitored at levels necessary to determine preferences for treatments or control areas.

(3) Vegetative cover, production, diversity, and levels of erosion resulting from treatments will be monitored to detect significant differences in these parameters, between treatment and control areas.

(4) Monitoring of erosion features and vegetative characteristics.

- BLM's Preferred Alternative

In addition to the Proposed Action, the following stipulations would be added:

H. Mitigation for all mining related impacts to wetland so that there is no net loss of in-kind habitat value. Such mitigation will

Section 15 Special Stipulations (Continued)

be developed through consultation with U.S. Fish and Wildlife Service (USFWS) and Colorado Division of Wildlife (CDOW).

I. The lessee shall work with CDOW to develop an employee program to inform workers of Colorado statutes regarding fish and game specific mitigative measures (including firearms and activity restrictions) developed to prevent illegal harvest on the lease. In addition, an incentive program will be developed by lessee to encourage compliance with these statutes and mitigative restrictions and cooperation with CDOW in apprehending offenders.

J. As part of the Permit Application Package, the lessee shall submit to OSM an estimate of the expected average annual water depletions to the Upper Colorado River Basin that will be caused by the mining operation. The estimate will be reviewed as part of the Section 7 (Endangered Species Act) consultation process. The lessee may be required, through Section 7, to adopt measures or alternatives as part of the permitted mining operation to preclude or avoid any adverse impacts on endangered fish species in the Upper Colorado River Basin.

K. No impacts to raptors or raptor nests will be permitted, except as specifically authorized by the USFWS and the CDOW. Approval for development of the lease will require that at the earliest possible date impacts to raptors or raptor nest sites can be identified. The lessee shall consult with USFWS and CDOW to develop site-specific plans to avoid and/or mitigate adverse impacts to raptor species.

(1) The lessee will annually monitor changes in nesting raptor densities and productivity in response to premining and postmining development throughout the project area. Development of monitoring procedures will be accomplished through further consultation with USFWS and CDOW.

(2) In consultation with USFWS and CDOW, the lessee shall monitor success of any mitigation that may be developed through avifauna impact studies (if determined to be needed during the permitting process).

L. The lessee shall apply techniques for maintenance of the biotic properties (the "seed bank," or the reservoir of seeds and other plant parts that are capable of growth or regeneration) of soils to the extent feasible in order to sustain soils productivity.

M. The lessee shall design postmining land forms to enhance characteristics of areas designed for elk calving and rearing, while sustaining or expanding the extent of south and west facing slopes that would be suitable for development as winter range or transitional stage.

(1) At a finer scale of topographic relief, slope surfaces will be shaped to produce a system of convex and concave surfaces prior to

redress of topsoil to produce topographic escape cover for elk, and to produce broad swales interconnected downslope with other swales, water impoundments and larger drainage features.

(2) North-facing slopes designated for calving/rearing use will include nearly level terrace or bench surfaces intended to serve as feeding or bedding areas.

N. Open water areas will be replaced with small impoundments designed to catch spring snowmelt, runoff, and groundwater discharge. Impoundments will be located in the lower reaches of drainages within the elk calving/rearing areas. Water sources for elk will be supplied in topographically higher sectors.

2. Soils and Vegetation

- Proposed Action

A. Soil depths will vary by vegetation, i.e., minimum depths of 2 feet for aspen stands, 18 inches for shrubland mosaic communities, and 12 inches for grassland areas would provide functional soil resource similar to resource presently utilized by indigenous vegetation.

B. Vegetation will be reestablished in approximately the same areal extent of each vegetative type, as prior to mining. Revegetation goals of establishing a self-sustaining vegetative cover will be met by transplanting root zone material (with a modified frontend loader), seeding, planting bare root materials, special topsoil management (avoidance of topsoil storage and rotary clearing of vegetation), and fencing where necessary to protect from wildlife.

C. The lessee will emphasize minimizing impacts to James Creek channel and floodplain. Where impacts are unavoidable, temporary stream modifications will be designed to safely pass the 100-year, 24-hour storm.

- BLM'S Preferred Alternative

BLM's Preferred Alternative would replace 2.A. and 2.B. with the following:

2.A.(1) If sufficient quantities of topsoil are confirmed by the detailed soil survey, the following depths will apply; otherwise, the exact topsoil depths determination will be deferred until mine plan stage:

2.A.(2) A minimum topsoil depth of 2.5 feet in aspen areas at all elevations, and north and east facing slopes at elevations 7,800 feet or greater.

Minimal topsoil depth of at least 1.8 feet in depth on south and west facing slopes above 7,800 feet.

Section 15 Special Stipulations (Continued)

Remaining topsoil depths will be at least 1.5 feet in the shrubland and 1.00 foot in the grassland areas.

Prior to surface disturbance of aspen soils, the lessee shall conduct studies on aspen reclamation techniques, including but not limited to creation of perennial seep areas. Actual study parameters, i.e., objectives, location, timeframe, size, will be deferred to the mine permitting process. If techniques can be developed that show statistical improvements in reclaimed aspen densities or growth and creation of alternate water sources, they will be incorporated into the overall reclamation plan.

Soil removed from aspen sites will be: 1) placed immediately on regraded backfill where aspen will be established, or 2) stockpiled separately and redistributed in areas where aspen will be established, unless Consol can demonstrate this practice is not necessary to protect the productivity of these soils.

2.A.(4) Organic matter analysis, microbial populations and diversity, and carbon nitrogen ratios will be conducted on premine soils and redistributed topsoils.

2.B. The lessee shall:

(1) Design post mined vegetation to be composed of 50 percent shrubland, 25 percent aspen, and 25 percent grassland.

(2) Conduct studies on the re-establishment of perennial seep areas.

(3) Ensure that postmine aspen stands at bond release will occupy at least 25 percent of the area and have at least 500 stems/acre, which are at least 5 feet in height and which have survived at least 5 years.

(4) Meet revegetation goals of establishing a self-sustaining vegetative cover by transplanting root zone material (with a modified frontend loader), seeding, planting of bare root materials, special topsoil management (avoidance of topsoil storage, and rotary clearing of vegetation), and fencing where necessary to protect from wildlife.

(5) Determine available moisture percentages (defined as the difference between 1/3 and 15 atmosphere moisture percentage) on all major areas of aspen soils prior to disturbance. Post aspen soils will duplicate these available moisture percentages as near as possible (the exact depth and variation from pre-disturbance soils values will be determined at mine plan stage).

• BLM's Preferred Alternative would require an additional stipulation (C), as follows:

C. The lessee shall design at least 20 percent of the sediment ponds to silt in and supply additional moist areas.

3. Water Resources

• Proposed Action

The lessee shall emphasize minimizing impacts to James Creek channel and floodplain. Where impacts are unavoidable, temporary stream modifications will be designed to safely pass the 100-year, 24-hour storm.

• In addition to the Proposed Action, the following stipulations will be added under BLM's Preferred Alternative:

A. The lessor shall require the lessee to protect James Creek through the use of a buffer strip. Development activities will be allowed if the lessee can ensure that the water quality and quantity in James Creek and the stability of the channel along James Creek will be adequately protected. The exact boundaries of the buffer strip will be determined during the permitting process.

B. The lessee shall design sediment ponds to withstand a 40-year, 24-hour storm.

C. The lessee shall study the possible re-establishment of perennial seep areas and establish them if practicable.

D. The lessee shall terrace slopes adjacent to waterways. Design considerations must ensure that slopes remain stable. Exact standards will be determined during the mine permitting process.

Proposed guidelines are: 150-foot terrace spacing on slopes less than 20 percent, 100 foot terrace spacing on greater than 20 percent slopes and designed for the 100-year, 24-hour storm. Minimum width of 10 feet and should drain on a 1 percent slope.

E. The lessee shall minimize transportation-related disturbances in James Creek. The lessee must demonstrate to the BLM at the mine permitting stage that adequate protection of the water quality and quantity and stability of James Creek are provided. (This may require the use of a conveyor, slurry pipeline, other appropriate techniques, or moving the haul road out of the James Creek channel.)

The lessee shall demonstrate to the lessor that location of the overburden stockpiles in the main channel of James Creek will not significantly impact the water quality and quantity of James Creek during and after mining. Any necessary design modifications will be designed by the lessee during the mine permitting process.

4. Cultural Resources • BLM's Preferred Alternative

Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall conduct a cultural resource intensive field inventory in a manner specified by BLM on portions of the mining plan area and adjacent areas, or exploration plan area, that may be adversely affected by lease related activities and which have not been previously inventoried at such a level of intensity.

Section 15 Special Stipulations (Continued)

A. The inventory will be conducted by a qualified professional cultural resource specialist (i.e., archaeologist, historian, or historical architect, as appropriate) approved by BLM, and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Office of Surface Mining (OSM)(*) and BLM(*). The lessee shall undertake measures, in accordance with instructions from OSM(*), to protect cultural resources on the leased land. The lessee shall not commence the surface disturbing activities until permission to proceed is given by OSM(*).

B. The lessee shall protect all known cultural resource properties within the lease area from lease related activities until the cultural resource mitigative measures can be implemented as part of an approved mining and reclamation plan or exploration plan.

C. The cost of conducting the inventory, preparing reports, and carrying out mitigative measures shall be borne by the lessee.

D. If cultural resources are discovered during operations under a lease, the lessee shall immediately bring them to the attention of OSM(*) or the authorized officer of either the surface management agency if OSM or the BLM, as appropriate, is not available. The lessee shall not disturb such resources except as may be subsequently authorized by OSM(*). Within two (2) working days of notification, OSM(*) will examine or have examined any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the lessee unless otherwise specified by the authorized officer of BLM or the surface managing agency (if different).

E. All cultural resources shall remain under the jurisdiction of the United States until ownership is determined under applicable law.

(*)...or the BLM authorized officer if activities are associated with coal exploration outside an approved mining permit area.

5. Paleontological Resources • BLM'S Preferred Alternative

The following stipulations will be used to protect paleontological resources.

A. Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall contact the authorized officer of the appropriate agency (state or Federal) to determine whether it will be required of the lessee to conduct and fund a paleontological appraisal of the mine plan, leasehold, or exploration plan area that may be adversely affected by lease- related activities. If one is required, the paleontological appraisal shall be conducted by a qualified paleontologist approved by the authorized officer of the appropriate agency (state or Federal), using the published literature and, where appropriate, field appraisals for determining

the possible existence of fossils of scientific significance. A report of the appraisal and recommendations for protecting any larger and more conspicuous fossils of significant scientific interest on the lease lands so identified shall be submitted to the authorized officer of the appropriate agency (state or Federal). When necessary to protect and collect the larger and more conspicuous fossils of significant scientific interest on the leased lands, the lessee shall undertake the measures provided in the approval of the mining and reclamation plan or exploration plan.

B. The lessee shall not knowingly disturb, alter, destroy, or take any larger and more conspicuous fossils of significant scientific interest, and shall, consistent with economic and safety considerations, protect such fossils in conformance with the measures included in the approval of the mining and reclamation plan or exploration plan.

C. The lessee shall immediately bring any such fossils that may be altered or destroyed by his operation to the attention of the Bureau of Land Management, as appropriate. Such fossils when discovered may be moved and operations may continue as long as the fossils specimen or specimens will not be seriously damaged or destroyed. The authorized officer of the appropriate agency (state or Federal) shall evaluate or have evaluated such discoveries brought to his attention and, within 5 working days after the fossil is brought to his attention, shall notify the lessee what action shall be taken with respect to such discoveries.

D. All such fossils of significant scientific interest shall remain under the jurisdiction of the United States until ownership is determined under applicable law. Copies of all paleontological resource data generated as a result of the lease term requirements will be provided to the authorized office of the appropriate agency (state or Federal).

E. The cost of any required salvage of such fossils shall be borne by the United States.

6. Access • BLM'S Preferred Alternative

The lessee shall maintain public access to public land adjacent to the lease by means of existing roads, trails, or ways. If the lessee must destroy or obstruct an existing route, the lessee shall provide an alternate route of equal quality. Public lands within the lease area and roads, trails and ways constructed by the lessee shall be made accessible to the public unless such access would interfere with mining operations or create a safety hazard. Limiting access within 1/2 mile of buildings and work areas should be adequate for this purpose. Any additional limitation must be approved by BLM. Public access and public recreational opportunities, including hunting, will be provided to any off-site lands purchased or leased for mitigative purposes.

The lessee shall not disturb surface lands within 100 feet of the right-of-way of Rio Blanco County Road 30 or Colorado Highway 13/789.

Sec. 15. SPECIAL STIPULATIONS (Cont'd.) -

THE UNITED STATES OF AMERICA

By

Company or Lessee Name

(Signature of Lessee) (Signing Officer)

(Title) (Title)

(Date) (Date)

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

This form does not constitute an information collection as defined by 44 U.S.C. 3502 and therefore does not require OMB approval.

☆ U.S. Government Printing Office: 1984—444-238/10210

APPENDIX D
MEEKER PRLA
ELK MITIGATION FEASIBILITY ASSESSMENT AND MITIGATION PLAN

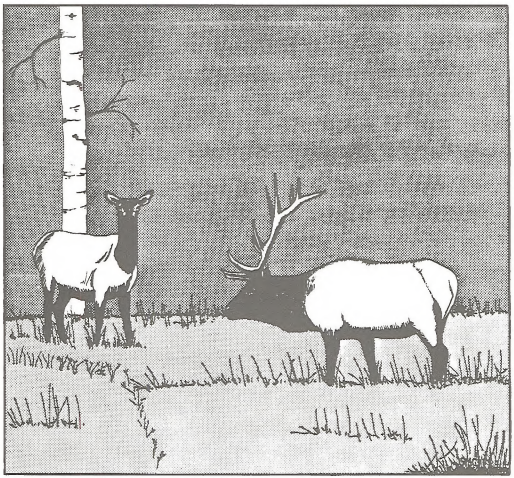
Meeker PRLA
Elk Mitigation Feasibility Assessment and Mitigation Plan

CONSOL

Consolidation Coal Company

Meeker Mine Plan

See Section 4



environmental engineers, scientists, planners, & management consultants CDM

Appendix D

MEEKER PRLA ELK MITIGATION STUDY

MITIGATION ASSESSMENT AND PLAN

PREPARED FOR:

CONSOLIDATION COAL COMPANY
CONSOL PLAZA
PITTSBURGH, PENNSYLVANIA 15241

PREPARED BY:

CAMP DRESSER & McKEE INC.
2300 15TH STREET, SUITE 400
DENVER, COLORADO 80202

DECEMBER 1984

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3.0 MITIGATION PLAN

The mitigation plan for the Meeker PRLA presented in this section incorporates results and recommendations of analyses described in Section 2 as committed mitigation measures. That is, Consol management is committed to the necessary land acquisition, habitat development, reclamation, and monitoring to fully implement and develop this plan. The purpose of this section is to describe mitigation commitments at a level of detail which provides BLM, CDOW, and interested public an adequate basis for decisions concerning effectiveness of proposed mitigation measures, based on information presented in the previous sections of this report.

3.1 IMPACT AVOIDANCE COMMITMENTS

Through use of impact avoidance strategy described in Section 2.3.1 an economically viable mine plan was developed for the Meeker PRLA and Federal Lease C93713 (Map 4-1, Section 4) which incorporated avoidance of 3,903 acres of elk winter concentration areas, 3,002 acres of elk calving areas and 1,888 acres of range suitable as winter or year around elk habitat (Table 3-1). No direct surface disturbance will occur within impact avoidance areas identified in Figure 3-1 as a result of Consol's proposed development.

These avoidance areas include Ninemile Gap winter and transitional ranges and a calving area south of Ninemile Gap which occurs within the boundaries of Federal Coal Leases C93716, C93715, and C93714 (Section 2).

3.2 OFF-SITE COMPENSATORY HABITAT ENHANCEMENT COMMITMENTS

Annual and annual cummulative impacts of the mine plan on elk winter concentration areas and calving areas at the Meeker PRLA (including avoidance commitments) were determined through SAGIS analysis described in Section 2.2. Results of this analysis are presented in Table 3-2. These results demonstrate the annual need for elk winter concentration and calving area replacement over the life of the proposed mine assuming no credit for reclamation, which is scheduled to proceed behind the advancing

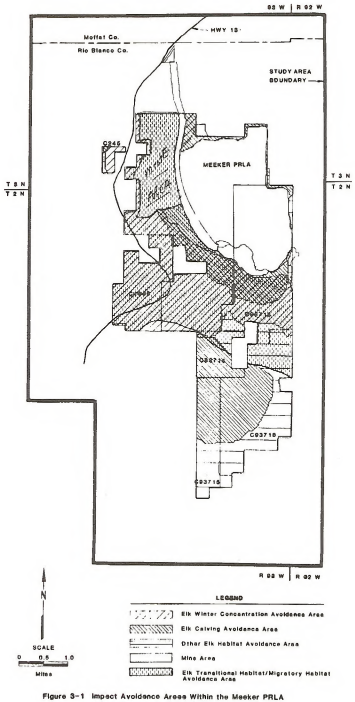


Figure 3-1 Impact Avoidance Areas Within the Meeker PRLA and Federal Coal Leases held by Consol.

Table 3-1 ACREAGES OF SEASONAL ELK USE AREAS AVOIDED THROUGH MINE PLANNING AT THE MEEKER FEDERAL COAL LEASES

Leases	Elk Winter Concentration Areas (ac)	Elk Calving Areas (ac)	Other Elk Features (ac)	Elk Migratory/ Habitat (ac) Transitional
PRLA Boundary	1,653.0	864.0	4.0	2,641.0
C93713	821.0	471.0	185.0	917.0
C93714	41.0	408.0	112.0	129.0
C93715	0.0	410.0	338.0	---
C93716	20.0	850.0	1,225.0	---
Lease 245	98.0	10.0	11.0	443.0
C1546	1,111.0	19.0	0.0	985.0
TOTAL	3,744.0	3,032.0	1,875.0	5,115.0

Table 3-2 ANNUAL AND CUMULATIVE SURFACE MINING IMPACTS TO ELK WINTER CONCENTRATION AREAS AND ELK CALVING AREAS AT THE MEEKER PRLA

Mining Features	Elk Winter Concentration Area (ac)	Buffered Annual Cum. Total Winter Conc. Area (ac)	Elk Calving Area (ac)	Buffered Annual Cum. Total Calving Area (ac)
TRANSPORTATION CORRIOOR	160.00		281.00	
TRANS. CORR. & BUFFER ZONE	266.00		489.00	
SURFACE FACILITY 1 (NORTH)	.00		32.00	
SUR.FAC 1 & BUFFER ZONE	105.00		360.00	
SURFACE FACILITY 2 (SOUTH)	.00		14.00	
SUR.FAC 2 & BUFFER ZONE	.00		294.00	
TOPSOIL STOCKPILE 1 (EAST)	.00		6.00	
TOPSOIL 1 & BUFFER ZONE	.00		19.00	
TOPSOIL STOCKPILE 2 (WEST)	.00		17.00	
TOPSOIL 2 & BUFFER ZONE	.00		43.00	
LOADOUT FACILITY	26.00		.00	
LOADOUT & BUFFER ZONE	116.00		.00	
OVERBURDEN STOCKPILE	.00		194.00	
OB STOCKPILE & BUFFER ZONE	21.00		290.00	
MINING DISTURBANCE YEAR 1	.00		221.00	
MD 1 & BUFFER ZONE	.00	460.00	385.00	1707.00
MINING DISTURBANCE YEAR 2	.00		107.00	
MD 2 & BUFFER ZONE	.00	460.00	163.00	1706.00
MINING DISTURBANCE YEAR 3	.00		90.00	
MD 3 & BUFFER ZONE	.00	460.00	128.00	1778.00
MD YEAR 4 (SOUTHERN)	.00		60.00	
MD 4 & BUFFER ZONE	2.00	462.00	91.00	1831.00
MD YEAR 4 (NORTHERN)	.00		122.00	
MD 4B & BUFFER ZONE	.00	460.00	243.00	2043.00
MINING DISTURBANCE YEAR 5	.00		182.00	
MD 5 & BUFFER ZONE	.00	460.00	310.00	2232.00
MINING DISTURBANCE YEAR 6	.00		113.00	
MD 6 & BUFFER ZONE	.00	460.00	251.00	1455.00
MINING DISTURBANCE YEAR 7	.00		101.00	
MD 7 & BUFFER ZONE	.00	460.00	251.00	2468.00
MINING DISTURBANCE YEAR 8	.00		96.00	
MD 8 & BUFFER ZONE	.00	460.00	253.00	2571.00
MINING DISTURBANCE YEAR 9	.00		100.00	

Table 3-2 ANNUAL AND CUMULATIVE SURFACE MINING IMPACTS TO ELK WINTER CONCENTRATION AREAS AND ELK CALVING AREAS AT THE MEEKER PRLA (continued)

Mining Features	Elk Winter Concentration Area (ac)	Buffered Annual Cum. Total Winter Conc. Area (ac)	Elk Calving Area (ac)	Buffered Annual Cum. Total Calving Area (ac)
MD 9 & BUFFER ZONE	.00	460.00	251.00	2665.00
MINING DISTURBANCE YEAR 10	.00		115.00	
MD 10 & BUFFER ZONE	.00	460.00	259.00	2773.00
MINING DISTURBANCE YEAR 11	.00		142.00	
MD 11 & BUFFER ZONE	.00	460.00	278.00	2907.00
MINING DISTURBANCE YEAR 12	.00		146.00	
MD 12 & BUFFER ZONE	.00	460.00	292.00	3063.00
MINING DISTURBANCE YEAR 13	.00		205.00	
MD 13 & BUFFER ZONE	.00	460.00	357.00	3274.00
MINING DISTURBANCE YEAR 14	.00		180.00	
MD 14 & BUFFER ZONE	.00	460.00	323.00	3445.00
MINING DISTURBANCE YEAR 15	.00		106.00	
MD 15 & BUFFER ZONE	.00	460.00	229.00	3531.00
MINING DISTURBANCE YEAR 16	.00		81.00	
MD 16 & BUFFER ZONE	.00	460.00	210.00	3618.00
MINING DISTURBANCE YEAR 17	.00		84.00	
MD 17 & BUFFER ZONE	.00	460.00	221.00	3710.00
MINING DISTURBANCE YEAR 18	.00		74.00	
MD 18 & BUFFER ZONE	.00	460.00	206.00	3779.00
MINING DISTURBANCE YEAR 19	.00		146.00	
MD 19 & BUFFER ZONE	.00	460.00	212.00	3859.00
MINING DISTURBANCE YEAR 20	.00		69.00	
MD 20 & BUFFER ZONE	.00	460.00	115.00	3908.00
MD YEAR 21 (WESTERN)	.00		33.00	
MD 21 & BUFFER ZONE	.00	460.00	81.00	3923.00
MD YEAR 21B (EASTERN)	.00		25.00	
MD 21B & BUFFER ZONE	.00	460.00	86.00	3961.00
MD YEAR 22 (WESTERN)	.00		11.00	
MD 22 & BUFFER ZONE	.00	460.00	33.00	3933.00
MD YEAR 22B (EASTERN)	.00		16.00	
MD 22B & BUFFER ZONE	.00	460.00	78.00	3989.00
MD YEAR 23 (WESTERN)	.00		17.00	
MD 23 & BUFFER ZONE	.00	460.00	152.00	4079.00

Table 3-2 ANNUAL AND CUMULATIVE SURFACE MINING IMPACTS TO ELK WINTER CONCENTRATION AREAS AND ELK CALVING AREAS AT THE MEEKER PRLA (concluded)

Mining Features	Elk Winter Concentration Area (ac)	Buffered Annual Cum. Total Winter Conc. Area (ac)	Elk Calving Area (ac)	Buffered Annual Cum. Total Calving Area (ac)
MD YEAR 23B (EASTERN)	.00		5.00	
MD 23B & BUFFER ZONE	.00	460.00	35.00	3979.00
MD YEAR 23C (FAR WEST)	74.00		11.00	
MD 23C & BUFFER ZONE	190.00	650.00	51.00	4000.00
MINING DISTURBANCE YEAR 24	55.00		46.00	
MD 24 & BUFFER ZONE	132.00	666.00	120.00	4080.00
MINING DISTURBANCE YEAR 25	93.00		127.00	
MD 25 & BUFFER ZONE	208.00	797.00	238.00	4244.00
MINING DISTURBANCE YEAR 26	74.00		77.00	
MD 26 & BUFFER ZONE	144.00	826.00	173.00	4316.00
MINING DISTURBANCE YEAR 27	57.00		88.00	
MD 27 & BUFFER ZONE	110.00	866.00	168.00	4388.00
MINING DISTURBANCE YEAR 28	47.00		77.00	
MD 28 & BUFFER ZONE	98.00	911.00	133.00	4441.00
MINING DISTURBANCE YEAR 29	53.00		41.00	
MD 29 & BUFFER ZONE	121.00	981.00	89.00	4474.00
MINING DISTURBANCE YEAR 30	10.00		103.00	
MD 30 & BUFFER ZONE	47.00	960.00	137.00	4563.00
MAXIMUM CUMULATIVE (BUFFERED) IMPACTS		1226.00		4750.00

pit. While replacement requirements for winter concentration areas remain modest (< 500 acres) through year 22 of scheduled mining disturbance, elk calving habitat replacement needs increase in linear fashion with mining surface disturbance.

The accumulative habitat replacement needs for winter concentration areas and elk calving habitat were determined to be 1,226 acres and 4,750 acres, respectively, including acreages of buffer zones (Section 2.2) established for impacted areas. To address these needs, Consol has committed to purchasing or leasing lands in sufficient quantity to mitigate mining impacts on a schedule which anticipates actual surface disturbance. The ratio of acres impacted to acres enhanced will vary based on site-specific characteristics of vegetation, range condition, and patterns of elk use. As a basis for mitigation planning (including land acquisition and estimation of mitigation costs), an acre for acre replacement ratio for impacted elk habitat has been assumed . Off-site compensatory enhancement treatments will be interspersed throughout extensive areas to preclude artificial concentration of elk in response to treatments. Candidate areas for this off-site compensatory habitat enhancement (selected as described in Section 2.3.2) are identified in Figure 3-2. The extent of existing seasonal elk use within each of the primary candidate areas depicted in Figure 3-2 is summarized in Table 3-3. Review of this information indicates that based on the existing regional distribution of elk (developed from results of baseline study), an ample supply of winter concentration area exists within the immediate vicinity of the PRLA to meet off-site habitat enhancement (replacement) needs. Likewise, it appears that off-site enhancement needs (Table 3-2) for calving habitat can be met by the supply of existing off-site calving areas. It should also be noted that on-site enhancement of calving and winter ranges, prior to mining, is also feasible based on Consol's Mine Plan (Section 4), and could be employed to temporarily compensate for habitat loss.

Site-specific commitments regarding the sequence and nature of habitat enhancement treatments within these candidate areas is not possible at this time due to the mosaic of federal and private properties involved. Information presented in Table 3-4 indicates that mountain shrubland and

sagebrush shrublands predominate on winter range improvement sites. Literature review indicates that these vegetation communities can be expected to respond to burning, fertilization, and a variety of mechanical treatments in a matter beneficial to wintering elk (Section 2.3.2.2). Following an inventory of baseline cover, production, and condition of shrubland stands within these candidate areas selected for off-site winter

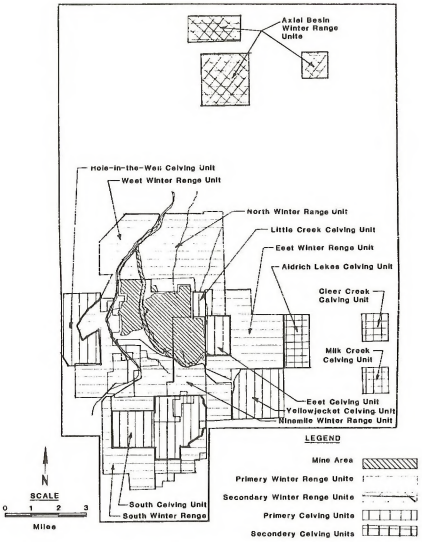


Figure 3-2 Locations of Primery end Secondary Off-Site Calving end Winter Renge Habitet Enhencement Areas in Relation to Potentiel Mining Disturbence et the Meeker PRLA.

Table 3-3 ACRES OF EXISTING SEASONAL ELK RANGES WITHIN PRIMARY AND SECONDARY OFF-SITE HABITAT IMPROVEMENT AREAS

Habitat Improvement Sites	Elk Winter Conc. Areas (ac)	Elk Severe Winter Range (ac)	Elk Calving Areas (ac)	Other Elk Features (ac)	Total Acreage
PRIMARY					
North Winter Range Unit	1686.0	0.0	253.0	3847.0	5786.0
South Winter Range Unit	376.0	505.0	102.0	2120.0	3103.0
Ninemile Winter Range Unit	3361.0	0.0	1009.0	695.0	4451.0
West Winter Range Unit	2848.0	0.0	621.0	1229.0	4698.0
East Winter Range Unit	0.0	0.0	0.0	3743.0	3743.0
Hole in the Wall Calving Unit	13.0	0.0	2694.0	570.0	2696.0
South Calving Unit	253.0	0.0	3121.0	779.0	4154.0
East Calving Unit	0.0	0.0	24.0	903.0	927.0
Yellow Jacket Calving Unit				2360.0	2360.0
Little Creek Calving Unit				309.0	309.0
TOTALS	8537.0	505.0	7824.0	16555.0	32227.0

Table 3-3 ACRES OF EXISTING SEASONAL ELK RANGES WITHIN PRIMARY AND SECONDARY OFF-SITE HABITAT IMPROVEMENT AREAS (concluded)

Habitat Improvement Sites	Elk Winter Conc. Areas (ac)	Elk Severe Winter Range (ac)	Elk Calving Areas (ac)	Other Elk Features (ac)	Total Acreage
SECONDARY HABITAT IMPROVEMENT SITES					
Aldrich Lakes Calving Unit				1325.0	1325.0
Clear Creek Calving Unit				685.0	685.0
Mill Creek Calving Unit				642.0	642.0
Axial Basin Winter Range Unit				4280.0	4280.0
TOTAL				6932.0	6932.0

Table 3-4 EXTENT OF EXISTING VEGETATION ON PRIMARY OFF-SITE HABITAT IMPROVEMENT AREAS WITHIN THE INTENSIVE STUDY AREA

Habitat Improvement Areas	Mountain Shrub (ac)	Sage-brush (ac)	Aspen (ac)	Wetlands (ac)	Douglas Fir (ac)	Bunch Grass (ac)	Pinyon Juniper (ac)	Barrenil (ac)	Mountain Grasslands (ac)	Totals[a] All Types (ac)
North Winter Range Unit	4061.0	731.0	78.0	30.0	0.0	0.0	0.0	0.0	3.0	5796.0
South Winter Range Unit	2230.0	431.0	130.0	64.0	0.0	0.0	191.0	0.0	0.0	3103.0
Minemile Winter Range Unit	2765.0	1275.0	66.0	76.0	0.0	66.0	0.0	0.0	0.0	4451.0
West Winter Range Unit	3513.0	540.0	169.0	23.0	0.0	21.0	0.0	0.0	0.0	4690.0
East Winter Range Unit	231.0	12.0	49.0	1.0	0.0	0.0	0.0	0.0	11.0	2742.0
Hole in the Wall Calving Unit	1231.0	76.0	850.0	20.0	7.0	1.0	0.0	0.0	70.0	2496.0
South Calving Unit	2832.0	548.0	705.0	121.0	0.0	0.0	0.0	0.0	0.0	4154.0
East Calving Unit	294.0	46.0	545.0	2.0	6.0	0.0	0.0	0.0	51.0	927.0
Little Creek Calving Unit	140.0	8.0	152.0	3.0	0.0	2.0	0.0	0.0	9.0	704.0
Yellow Jacket[b] Calving Unit										2360.0
TOTAL	17207.0	3669.0	2544.0	350.0	13.0	90.0	191.0	0.0	84.0	

[a] Vegetation mapping incomplete for these areas; acreages include area within these units outside the intensive study area.

range mitigation efforts, specific treatments (derived from techniques described in Section 2.3.2) and schedules for their application will be identified. Scheduling of these treatments to provide maximum beneficial range responses in step with anticipated compensatory off-site habitat enhancement needs (Table 3-2) is envisioned. For some areas and treatments (e.g., fertilization), a rotational pattern of range enhancement treatment may be appropriate. Mountain shrub and aspen predominate on candidate areas selected for calving habitat enhancement (Table 3-4). Purchase or lease of these areas will be followed by selection of appropriate habitat enhancement treatments, based on inventory of existing range conditions and anticipated needs or calving habitat replacement (Table 3-2). Aspen stands on these areas will be managed to insure longevity in order to provide thermal cover throughout the course of habitat enhancement efforts. Appropriate methods for off-site enhancement of mountain shrubland, sagebrush shrubland, and meadow (wetland) vegetation stands will be identified based on a rotational pattern of treatments including fall burning, fall range fertilization, and release of grazing pressure.

Regional experts in the areas of fire and range ecology will be consulted in selection of treatments. Scheduling and application of all off-site habitat enhancement treatments will be coordinated with CDOW, Colorado MLRD, and BLM.

Fencing of primary roadways (Highway 13 and the Coal Creek Road) and construction of highway underpasses in areas identified as primary elk crossings (based on results of on-going studies and consultation with CDOW and the Colorado Department of Highways) will be completed to mitigate increased mortality which may occur as a result of development at the Meeker PRLA.

Public hunting opportunities lost as a result of mine development (assuming CDOW maintains surface control of the Jensen State Wildlife Area) will be mitigated through an offsetting increase in public access to areas obtained by Consol for purposes of off-site compensatory mitigation. Consol will work with CDOW to develop access arrangements for these areas.

Consol will work with CDOW to develop an employee program to inform workers of Colorado Statutes regarding taking of fish and game and specific mitigation measures (including firearms and activity restrictions) developed to prevent illegal harvest at the PRLA. In addition, an incentive program will be developed by Consol to encourage compliance with these statutes and mitigation restrictions and cooperation with CDOW in apprehending offenders.

3.3 RECLAMATION COMMITMENTS

Information presented in this section describes resources and technology proposed for use in reclaiming mined and otherwise disturbed areas. Specific elements of the reclamation process are described, including appropriate alternative technologies, which permit projection of reclamation success within a conservative timeframe. This information demonstrates that reclamation practices can (over time) offset effects of mining through replacement and enhancement of habitat features which are important to elk.

3.3.1 Reclamation Site Plan

Topsoil redistribution and management will be directed toward reestablishment of functional relationships between soil depth and vegetation characteristics. Based on observation of soil profiles within the PRLA, minimum depths of 2 ft for aspen stands, 18 in. for shrubland mosaic communities, and 12 in. for grassland areas would provide functional soil resources similar to resources presently utilized by indigenous vegetation. Techniques for maintenance of the biotic properties of soils, described in Section 3.3.2, will be applied to the extent feasible to sustain productivity and the "seed bank" or reservoir of seeds and other plant parts which are capable of growth or regeneration. Location of soil stock piles are identified in Section 4.0; the pattern of soil depth will be determined by vegetation pattern.

Land forms which characterize the Meeker coal leases and surrounding landscape include narrow valley bottoms; steep, relatively linear south-facing slopes; less steeply angled, longer, and curvilinear north-facing slopes; swales; and ridges. Each of these land form elements would be restored in the post-mining landscape of the coal leases.

Post-mining topography has been developed to enhance characteristics of areas designed for elk calving and rearing (generally north- and east-facing slopes in close proximity to south-facing slopes) while sustaining or expanding the extent of south and west facing slopes which

would be suitable for development as winter range or transitional range. Concomitantly, topographic features adjacent to the mine will be carried into or through the post-mining landscape and will restore the location of designed elk use areas relative to surrounding use areas. Proposed topographic features are illustrated in Figure 3-2.

At a finer scale of topographic relief, slope surfaces will be shaped to produce a system of convex and concave surfaces prior to redress of topsoil. Shaping would provide topographic escape cover for elk. As practiced at the Trapper Mine near Craig, Colorado, slope shaping is performed by dozers working along elevational contours to produce broad swales interconnected downslope with other swales, water impoundments, and larger drainage features.

North-facing slopes designated for calving/rearing use would include nearly level terrace or bench surfaces intended to serve as feeding or bedding areas. Such features would also serve surface water and erosion control needs particularly during earlier phases of vegetation establishment.

The proposed post-mining contours have been developed with reference to the overburden volume anticipated, slope stability requirements, and limits of overburden and soil handling equipment. Overall relief and topographic variation is anticipated to increase small scale environmental variation and thereby enhance plant as well as wildlife species diversity achievable within the post-mining landscape.

Open water is recognized as an important element of habitats used by elk during the late spring to early summer calving/rearing period. To supply water, runoff from spring snowmelt will be captured in small impoundments along each of the tributary branches of James, Little, and Elkhorn creeks. Impoundments will be located in proximity to aspen, Gambel oak, and other shrubland stands designed for calving season and transitional season use.

Siting of individual impoundments will also be predicated on the optimal locations for collection of both surface water runoff and ground water discharge. As such, it is anticipated that ponds will be situated in the

lower reaches of drainages within the elk calving/rearing areas. The majority of recharge to these ponds will occur via snowmelt during spring months. Establishment of tree and shrubland stands on north-facing slopes will enhance the accumulation of snow during winter, and therefore, increase yields during snowmelt periods.

Existing data indicate that the post-mining backfill areas should be characterized as a single, unconfined ground water system. The eventual piezometric levels which become re-established in the backfill cannot be determined at this time. It is likely, however, that the post-mining piezometric surface will be a reflection of surficial topography, with a slight ground water gradient towards topographically low areas. This would allow for some ground water discharge along valley bottoms. Such discharge would, then, also be a source of water for impoundment storage, particularly during spring months. Ground water discharge would be expected to diminish significantly during the early summer months (June, July). The quality, quantity, and duration of ground water flow will depend on specific backfill characteristics and on the lithologic and structural conditions of undisturbed strata. It is anticipated that the stratigraphic dip on the north and east sides of the James Creek valley will facilitate ground water discharge.

As noted, optimal pond locations occur in the lower reaches of tributaries to James, Elkhorn and Little Creeks. To provide water for elk in topographically higher sectors, a series of smaller impoundments will be constructed in the headwater areas of each drainage. In this manner, early spring runoff could be captured in both upper and lower stream reaches, enhancing storage of runoff.

Vegetation

Over the life of the mine, vegetation would be removed from an area of approximately 5,200 acres including surface facilities, transportation corridors, a loadout, soil and overburden storage, and two pit extraction areas. Vegetation which would be affected by mining includes a mosaic of shrublands dominated by serviceberry (Amelanchier utahensis), snowberry

(Symphoricarpos oreophilus), Gambel oak (Quercus gambelii), and sagebrush (Artemisia tridentata) which comprises 73 percent of the area. Aspen (Populus tremuloides) stands, mixed on their margins with tall shrubs, comprise approximately 1,150 acres or 22 percent of the mine area. Montane grasslands on ridges and alluvial fans, and a system of meadows and wetlands along James Creek and its tributary branches are also present. The pattern and relative abundance of vegetation at the site (Figure 3-3) are reproduced in the revegetation plan (Figure 3-5) in relationship to topographic features and the micro-climatic variation imposed by topography.

The revegetation plan provides for approximately the same areal extent of each vegetation type as that prior to mining. However, the configurations and character of proposed vegetation would provide enhanced forage production and availability on winter range and a pattern of resource availability (water, gentle topography, forage, and hiding cover) in calving areas which would resemble conditions evident in the most intensively used calving areas of the region.

The extensive shrublands of the reclaimed site are envisioned as relatively open areas dominated by caespitose and rhizomatous native grasses, legumes, and herbaceous plants in combination with shrubs less than 3 feet tall (rose, snowberry, sagebrush). Taller shrubs (oak, serviceberry) would be located on slope features most favorable for establishment and growth: swales, leeward slopes, pond margins, and drainage control features. The taller shrub aggregations would be linear to oblong in outline and of adequate width to provide hiding (escape) cover from points of view outside of the shrub stands.

Functional hiding cover, with shrubs in excess of 6.5 feet in height, is anticipated to develop over a period of 10 to 15 years primarily within the 20 to 25 percent of the area where transplants and shrub plantings are concentrated. Tall shrubs may develop in the remaining area over a substantially longer period governed by climatic episodes, actual land use, and other factors which will affect the reproductive success and establishment of each species.

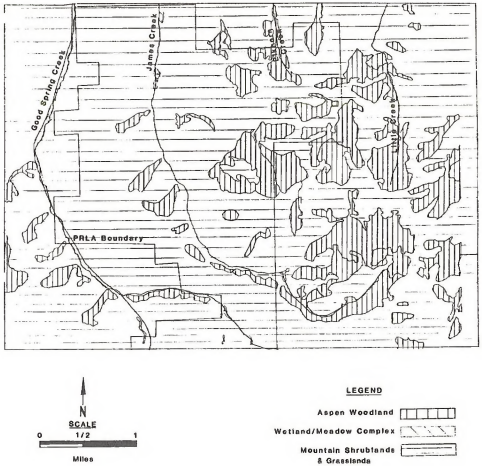
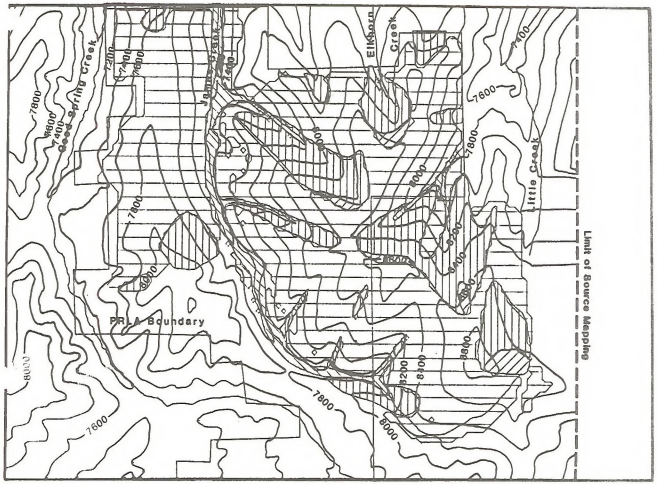


Figure 3-3 Pre-mining Vegetation, Meeker Coal Leases.



Source: Consolidation Coal, 1984.

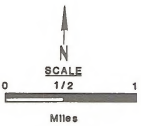


Figure 3-4 Reclaimed Surface Topography.

Figure 3-5 Revegetation Plan, Meeker Coal Leases.

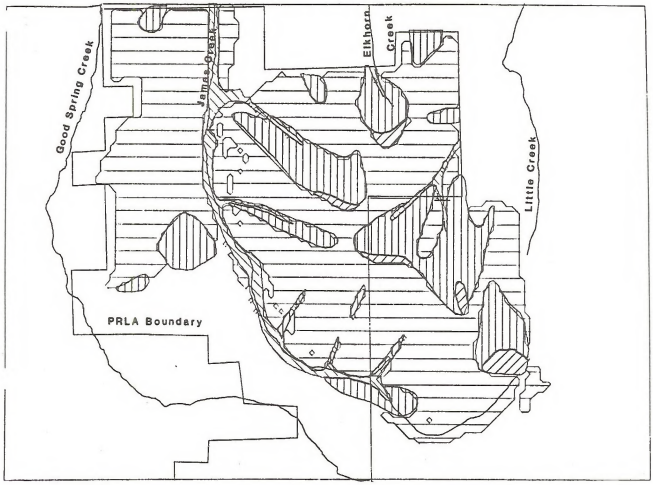


Figure 3-5 Revegetation Plan, Meeker Coal Leases.

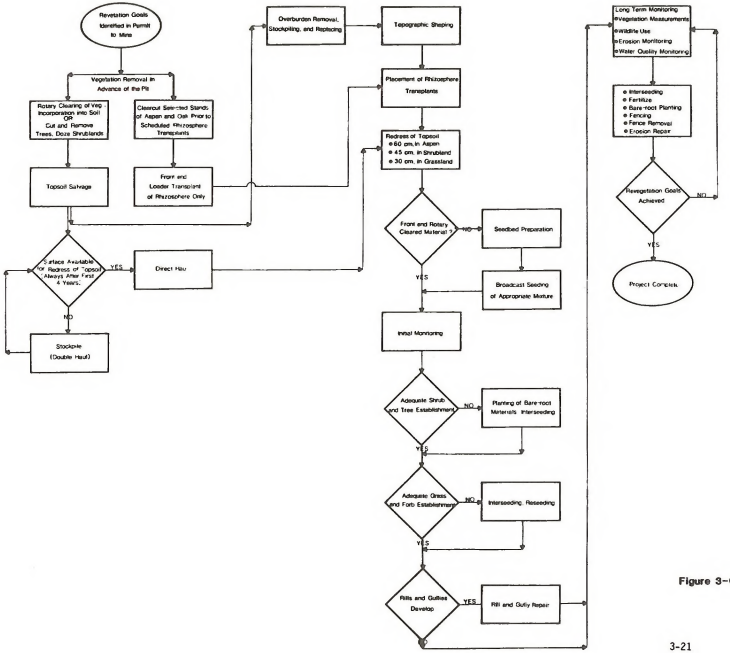


Figure 3-6 Revegetation Process.

Aspen regeneration areas would be initially composed of evenly spaced groups of trees which would be managed to encourage rapid expansion of cover and toward canopy cover and hiding cover characteristics similar to existing stands. Appropriate management techniques are described by Perala (1977). Shrub plantings at the margins of aspen stands would be used to increase hiding cover as viewed from outside of aspen stands.

Meadow and wetland areas would be developed primarily along the valley bottom of James Creek and along larger tributary drainages of Little and Elkhorn creeks. Impoundments would provide small open water habitats which would be surrounded by emergent semi-aquatic vegetation and stands of willows (Salix caudata) and cottonwood (Populus deltoides). Gently sloping valley bottoms would be planted primarily with rhizomatous native grasses resistant to erosion and tolerant of occasional flooding.

3.3.2 Proposed Revegetation Procedures and Technological Alternatives

To achieve revegetation goals throughout the coal lease areas affected by mining, procedures to establish a self-sustaining vegetation cover would be integrated with mine operations as indicated in Figure 3-6. Coordination is particularly essential to complete vegetation removal and transplant work not only prior to topsoil salvage and overburden removal, but during a season most favorable for transplant success (autumn). Each of the proposed revegetation procedures identified in Figure 3-4 has been successfully employed, at a similar scale, by mine reclamation personnel in northwest Colorado.

Transplant of root zone material (the rhizosphere), after removal of above-ground stems and trunks, is suggested in place of attempts to transplant entire mature trees and shrubs. This modification of the front-end loader transplant technique may enhance survival and stimulate aspen and oak stem regeneration from adventitious buds of roots. Research results indicate that transplant survival of larger materials is inferior to the survival of smaller species and individuals (Carlson 1981), whereas clear cutting stimulates development of stems from roots (Schier and Smith 1979).

Shrub and tree establishment are recognized as the most difficult revegetation goals pertinent to the coal leases. Four separate approaches would be employed as necessary to assure establishment of trees and shrubs. These include direct transplant, seeding, planting of bare root materials, and special topsoil management. Topsoil handling would include an avoidance of topsoil storage and rotary clearing of vegetation and soil material to enhance regeneration from underground plant parts and from native seed resources transported with salvaged soil to the reclaimed surface. Young plants would be protected from wildlife by fencing where necessary. Additional sapling establishment would be promoted in aspen stands by shearing and other management techniques described in the silvicultural literature (Olson and Lundgren 1978; Perala 1977). Creation of Douglas-fir stands would be approached primarily through planting of bare root seedlings in favorable areas.

Alternative site preparation approaches performed prior to topsoil salvage include rotary clearing (noted earlier as a means of enhancing regeneration of plants from plant parts and seed resident in the soil) and more customary clear-cutting and scraping. Initial results at the Foidel Creek Mine south of Steamboat Springs, Colorado, suggest that rotary clearing may enhance results as well as cost-effectiveness in relationship to typical clearing. Apparent advantages include a simplified clearing procedure, enhanced organic matter content of soils, decreased bulk density, and incorporation of indigenous seed sources. Ongoing research is expected to further confirm the viability of this technique which employs equipment modified from that which is used to grind asphalt roadways (Johnson 1983).

As outlined in Figure 3-6, verification and monitoring of revegetation success would trigger remedial technologies as applicable to the extent and character of particular shortfalls. Additional plantings, interseeding, or reseeding may be needed as a result of unpredictable climatic events. Monitoring will detect erosion features and enable their repair to prevent further soil loss or degradation of vegetation.

3.4 MONITORING COMMITMENTS

Consol recognizes regulatory mandates for monitoring of the effectiveness and adequacy of committed mitigation discussed in Section 3.1 through 3.3, including Council on Environmental Quality (CEQ) Regulations (40 CFR 1505.2-3), Department of the Interior (DOI) and BLM guidelines and policy statements including 516DM.3 (D)(4) and BLM Information Memorandum No. 82-169. Based on these regulations, guidelines and policy, and recommendations presented in Section 2.4 of this report, Consol has incorporated monitoring of elk responses to mining, reclamation, and off-site enhancement as a committed mitigation measure. The nature of monitoring goals and objectives identified in Section 2.4 dictates a need for long-term intensive monitoring employing state-of-the-art technology. In accordance with guidance provided by BLM's Colorado Environmental Handbook (BLM 1983), monitoring commitments presented here will address the following details:

- o Objectives of committed monitoring activities and conceptual approaches to them.
- o Commitments of manpower to acheive monitoring objectives.
- o Commitments of minimum levels of monitoring effort.
- o Identification of costs of this monitoring and commitment to fund these efforts.

Additional details including sampling plans, refined estimates of levels of field effort, and data analysis techniques (which are beyond the scope of this report) will be developed following a leasing decision for the Meeker PRLA.

3.4.1 Objectives and Approaches to Monitoring

Consol's commitments for monitoring at the PRLA address five principal topics discussed in Section 2.3.4:

1. Behavioral and reproductive reponse of elk to mining disturbance.

2. Behavioral and reproductive response of elk to off-site habitat enhancement treatments.
3. Response of vegetation to off-site habitat enhancement treatments.
4. Revegetation success including cover, production, diversity, erosion, and reestablishment of elk use.
5. Direct loss of elk to road kill and illegal harvest.

Commitments concerning conceptual approaches to each of these topics are presented in the sections which follow.

3.4.1.1 Monitoring of Elk Response to Mining

Long-term changes in elk distribution and range use in response to mining disturbance will be monitored by means of an on-going program of elk capture and telemetry monitoring. Recapture of radio-collared elk will be conducted as necessary to restore transmitters (prior to battery failure) and to provide a long-term history of changes in home range location, size, and habitat characteristics in response to mining disturbance. Cow elk will be located with the aid of radio-telemetry following the calving season to assess their annual reproductive performance. A variety of capture methods would be employed in coordination with the CDOW. Calf elk will also be captured, fitted with radio transmitters, and recaptured as necessary to monitor their survival and recruitment to the elk herd. This program will be conducted at the PRLA as well as control areas outside the influence of mining disturbance. Sample sizes necessary to test statistical significance of production, recruitment, and changes in home range characteristics will determine the number of elk which will be instrumented with radio transmitters. Presently, it is envisioned that 50-75 radio transmitters will be kept in service during the course of this program which will continue throughout the life of the mine.

3.4.1.2 Response of Elk and Vegetation to Off-Site Habitat Enhancement Treatments

Response of elk to habitat enhancement treatments will be monitored through comparison of levels of elk use at treatment versus control (no treatment)

areas using a pellet group plot index to elk use. Radio-collared elk (Section 3.4.2) will be monitored at levels necessary to determine preferences for treatments or control areas. Home range shifts and patterns of elk use within them will be analyzed to assess the existence of any such preferences. This program will be conducted throughout the life of the mine.

3.4.1.3 Monitoring of Vegetation Responses to Off-Site Habitat Enhancement Treatments

Vegetation cover, production, diversity, and levels of erosion resulting from treatments will be monitored to detect significant differences in these parameters, between treatment and control areas. Forage quality responses to treatments will also be monitored through collection and laboratory analysis of vegetation. Parameters of forage quality to be monitored will be selected with the assistance of CDOW Big Game Researchers. The significant expertise and laboratory capabilities of CDOW's research staff will be utilized to the extent possible, including cooperative research efforts in the area of forage quality analysis. Sampling plans and methods of analysis will be selected based on sample adequacy requirements determined by statistical testing techniques. Monitoring of vegetation response to treatments will continue until the efficacy of habitat enhancement treatments is determined as a basis for adjustment of off-site habitat replacement commitments and schedule. At present, this monitoring program is envisioned to continue for a minimum of 10 years.

3.4.1.4 Monitoring of Revegetation Success

Monitoring of erosion features and vegetation characteristics (cover, annual production, woody plant stem density, and species diversity) are routinely required of mine operators under MLRD regulations. Quantitative vegetation goals are set for reclaimed areas based upon reference areas selected to represent each pre-mining vegetation type. One goal of long term vegetation monitoring is to establish the relationship between the reclaimed area and these official standards of success. Under MLRD

regulations, performance the 9th and 10th year subsequent to the last significant reclamation activity will provide criteria for reclamation bond release.

Intensive monitoring will be conducted at the Meeker PRLA during the initial seasons following the redress of topsoil and the planting or transplanting of materials to affect appropriate remedies and to establish the earliest possible date for the termination of revegetation activity. This initial monitoring and monitoring throughout the first 10 years subsequent to revegetation are routine at surface coal mines under MLRD regulations.

Additional long-term monitoring will be conducted at the Meeker coal leases to identify and document the achievement of habitat-based reclamation goals, particularly the establishment of vegetation providing escape cover and thermal cover as quantified by production, canopy cover, and horizontal line-of-sight measurements of the vegetation and quantitative measures of elk use. This information will provide a basis for ongoing evaluation of the need for habitat enhancement needs within the reclaimed area and at off site habitat enhancement areas. This monitoring program will continue throughout the life of the mine.

3.4.1.5 Monitoring of Road Kill and Illegal Harvest

Monitoring of elk losses resulting from road kill and poaching will be monitored in coordination with CDOW field staff. Results of this monitoring will be used as a basis for adjustments to mitigation efforts designed to minimize such losses (Section 2.3.4) including fencing and roadway underpasses. This program will continue throughout the life of the mine.

3.4.2 Manpower Commitments for Monitoring

To achieve objectives of monitoring commitments presented in Section 3.4.1, on-site staff requirements based on committed levels of effort were identified as follows:

1 Full-time Wildlife Biologist to act as Principal Investigator for wildlife monitoring efforts.

1 Part-time (seasonal) Wildlife Biologist to act as a Field Assistant to the Principal Investigator.

1 Full-time reclamation specialist to act as Principal Investigator for revegetation monitoring efforts.

2 Part-time (seasonal) biologists to act as Field Assistants to the Principal Investigator

Direct (salary) and indirect (benefits) costs of employing a staff of this size were incorporated in the economic analysis of the proposed mine at the Meeker PRLA.

3.4.3 Commitments of Minimum Levels of Effort for Monitoring Activities

As discussed in Section 3.4.1, sampling methods and data analysis procedures for this monitoring plan will be selected though consultation with statisticians and researchers working in areas addressed by monitoring objectives. Some sample methodologies will, in turn, depend upon characteristics of off-site habitat enhancement treatment areas (Section 3.2) selected in the final mitigation plan for the Meeker PRLA. Based on monitoring commitments presented here, the following durations for monitoring programs are envisioned:

Monitoring Program	Duration
Monitoring of Elk Response to Mining	Life of Mine
Monitoring of Elk Response to Off-Site Habitat Enhancement Treatments	Life of Mine
Monitoring of Vegetation Responses to Habitat Enhancement Treatments	10 Years (minimum)
Monitoring of Vegetation Success	Life of Mine (until Bond release)
Monitoring of Road Kill and Poaching Losses	Life of Mine

Levels of effort required to achieve the objectives of this monitoring program, in a manner consistent with scientifically acceptable standards

for such research, are committed as part of the monitoring program for duration of each program as listed above.

3.4.4 Funding Commitments for Monitoring Efforts

Due to the duration of activities identified in this plan, costs of the monitoring program will be influenced by a number of variables which are readily apparent at this time. These include: sampling methodologies; inflation and resultant increases in the cost of salaries, goods, and subcontractor services; and the potential for modification of monitoring commitments based on results of these investigations. Based upon the scope and duration of monitoring commitments presented here, an average annual cost of $300,000 (1984 dollars) was identified as an appropriate level of financial commitment. The cost has been factored into mine operation costs for the Meeker PRLA.

APPENDIX E
REGIONAL ANALYSIS OF CULTURAL RESOURCES

The cultural resources record in the Danforth Hills is derived from inventories that have been conducted as the result of energy development over the past 10 years. The inventories range from small linear/block inventories for coal exploration to large block surveys conducted prior to lease development (table E-1).

The cultural resources that have been identified in the Danforth Hills range from Paleo-Indian period bison kill sites to historical homesteads. Although the cultural resources represent all the major time periods of human occupation in northwest Colorado, they generally represent a limited distribution and range of economic activities.

A general discussion of the cultural resources in northwest Colorado may be found in Grady (1984), Cassells (1983), and Athearn (1976). The former two sources discuss the basic outline of prehistoric cultures, and the latter source provides a history of northwest Colorado. In the Danforth Hills, the following references summarize the cultural resource data base: Arthur 1977, Henss and Anderson 1979, Jennings and Sullivan 1977, Kranzush 1982, Lischka 1975, Piontkowski, Schwartz and Meacham 1980.

The patterns of prehistoric and historical site location that emerge may be summarized as follows:

- The majority of the Danforth Hills area is not conducive to site location, and cultural resources seem to be confined to small atypical areas.
- Overall site density is low. One resource (sites and isolated finds) exists per 73 to 260 acres or one site per 114 to 1,560 acres.
- The natural environment is quite lush. It provided prehistoric peoples with a wide diversity and high quantity of plant and animal food sources. However, the lush vegetation, high topographic variability and limited seasonal mobility and livability limited the use of the area.

For the reasons discussed above, historical occupation has been limited to seasonal livestock use and wildlife hunting.

The primary period of homesteading occurred from 1917-1930 and again in the late 1930s. (See table E-2 for cultural resources located in the Danforth Hills.)

Several factors influence locating cultural resources in the Danforth Hills. First, the lush, dense vegetation obscures much of the ground and limits mobility. Second, deposition of soils on slopes and along major streams seems to be on-going and extensive. Therefore, cultural resources are not as likely to be fully discovered in the area as in others, and disturbance of the surface may reveal many more sites than are evident on the surface.

Two cultural resources have been evaluated for inclusion on the National Register of Historic Places (36 CFR 60). The Thornburgh Battle site, a result of the battle that was fought between the U.S. Army and the Utes following the Meeker Massacre in 1879 at the White River Indian Agency near Meeker. The site is located in section 27, T. 3 N., R. 92 W., and is located some distance from the tract. The other site is not on the National Register but does qualify because of its uniqueness. The Somemore site (5MF969) is a bison kill site probably of the Paleo-Indian period. It is located in section 25, T. 4 N., R. 94 W., and is not near the tract. The other cultural resources have not been evaluated and therefore their status to the National Register is not known.

TABLE E-1
CULTURAL RESOURCE INVENTORIES IN THE DANFORTH HILLS

REFERENCE	*T.*	*R.*	*SECTION*	*FINDINGS*
Armstrong, Wignall, 1981	3	94	2-11, 14, 15, 17-22	3 prehistoric sites
	4	94	7-23, 26-34	5 isolated finds
Arthur, 1977	4, 5	87		
	6	89-91	Multiple	None in Danforth Hills
Babcock, 1982	3	93	19	None
Baker, Reed, 1978	3	93	19, 30	5 prehistoric sites
Brownfield, 1975b	3	93	7, 16	None
Brownfield, 1975c	3	93	26	None
Creasman, 1983c	3	94	34	None
Conner, 1977b	4	93	27, 34	None
Gordon, 1977	3	92	28	None
Gordon et al., 1982	2, 3, 4	92, 93, 94	Multiple	1 prehistoric site
Greer, 1980	4	92	22	None
Hansen, 1977a	3	94	23, 26	None
Hansen, 1977j	4	92	24	None
Hansen, 1977s	4	94	23	None
	4	93	28	
Hansen, 1977w	3	94	1	None
Hansen, 1978b	4	92	22	None
Hansen, 1978l	3	92	9, 16	None
Hansen, 1978m	3	94	27	None
Hansen, 1978p	4	94	15, 17, 18, 29, 32	None
	3	94	7, 19	
Hansen, 1978s	3	93	17, 19, 21, 28, 29	None
Hansen, 1978u	3	93	8, 11, 15	None
Hansen, 1980w	3	94	3, 4, 5, 8, 9	None
	4	94	32, 33, 34, 37	
Hartley, 1983a	3	93	15, 19-22, 29	None
Horvath, 1980	3	93	31	None
	3	94	36	
Jennings, 1978b	4	93	29, 31	1 prehistoric site
	4	99	25, 36	
	3	93	6	
Jennings & Sullivan, 1977	2	92	Multiple	None in Danforth Hills
	2	93		
	2	94		
Johnson, 1981a	3	93	2	Historical structure and open lithic sites
Johnson, 1981b	3	93	2-5, 8-11, 14-17	Rock Shelter
	4	93	32-35	
Kainer, 1983	3	94	2, 3	4 prehistoric and historical sites; 13 prehistoric and 1 historical isolated find
	4	94	25, 26, 36	
	4	93	20, 21, 27, 30	
Keesling, 1983k	3	94	27	None
Knox, 1980	2	92	6	None
Kranzush, 1980b	3	93	7	1 historical site
Kranzush, 1980c	3	93	7, 8, 17-21, 29	1 historical and 2 prehistoric isolated finds
Kranzush, 1982	4	94	35, 36	3 prehistoric and 2 historical sites, 3 prehistoric isolated finds
Lischka, 1975	3	93	Multiple	2 prehistoric and 4 historical sites
Luoma & Jennings, 1980	4	93	6, 29, 31, 32	2 historical sites, 1 isolated find
	4	94	36	

TABLE E-1 (continued)

REFERENCE	*T.*	*R.*	*SECTION*	*FINDINGS*
Nickens, 1980	3	94	27	None
Nordby, Nickens, 1974	3	93	2-4, 9, 10	1 prehistoric site
	4	93	33, 34	
Piontkowski, 1980	4	93	Multiple	
	4	94		1 prehistoric and 2 historical sites, 3 isolated finds
Schwartz, 1979a	2	93	6, 7	None
	2	94	1, 2	
	3	94	35	
Schwartz, 1979b	2	93	6	None
	2	94	1, 2, 11	
	3	94	36	
Treat & Newkirk, 1981	2	94	11, 14	None
	3	93	17, 18, 19	
	2	93	24	
	2	92	18, 19	
	3	92	24, 25, 27, 35	

TABLE E-2
CULTURAL RESOURCES LOCATED BY INVENTORIES IN THE DANFORTH HILLS

References	OL[1]	SL[2]	OA, SA[3]	SC[4]	OC[5]	RA[6]	H[7]	IF, P[8]	IF, H[9]	IF, UNK[10]
Armstrong, Wignall, 1981	1		2	1	1 (Late pre 3)			2	2	1
Baker, Reed, 1978			1		2					
Baker, Wood, 1978								1		
Gordon et al. 1982								5		
Henss, Anderson, 1979	1						2	8	4	
Jennings, 1978b	1									
Johnson, 1981a	1						1			
Johnson, 1981b		1								
Kainer, 1983	2				2		2	12		
Kranzush, 1980b									1	
Kranzush, 1980c								2		
Kranzush, 1982	2				1		2	3		
Lischka, 1975	2						4			
Luoma, Jennings, 1980							2	1		
Nordby, Jennings, 1974						1				
Piontkowski, 1980	1	2					2	2	1	

[1]OPEN LITHIC (OL): Lithic scatters located in open topographic situations. Material culture includes waste flakes and chipped stone tools. This type is often referred to as lithic scatters, chipping stations, limited loci.

[2]SHELTERED LITHIC (SL): These sites are located in rock shelters, overhangs, or alcoves, and contain chipped stone tools and waste flakes.

[3]OPEN ARCHITECTURAL (OA): Prehistoric sites situated in open topographic situations and containing architectural features. These features may be stone walls, pit houses, stone alignments, enclosures, multi- or single-room structures, or cabins, etc.

[4]SHELTERED ARCHITECTURAL (SA): These sites are similar to open architectural sites, except they are located in rock shelters, overhangs, or alcoves.

[5]SHELTERED CAMP (SC): Sites located in rock shelters, overhangs, or alcoves, and consisting of features or artifacts which indicate domestic activities. The presence of one or more of the following defines the activities: ground stone, ceramics, fire hearth, and middens.

[6]OPEN CAMP (OC): These sites are the same as sheltered camps except they are located in open topographic locations.

[7]TRAILS/ROADS: Path or passage way and/or a prepared path somewhat wider than a trail. Examples: Wise Road, Ellis Trail, and Fortification Trail.

[8]ROCK ART (RA): Petroglyphs and/or pictographs that are not associated with any other class of cultural material.

[9]HISTORIC (H): Sites containing some sort of historical structure, such as cabins, corrals or barns, or historical trash.

[10]ISOLATED FIND: (IF;P; IF;H; IF,unk) Single artifacts or phenomena. There is a wide variety of definitions for this type—use this category when the isolated find form is employed. Other elements will further define this category.

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  Geological Survey
  National Park Service
  Office of Surface Mining (cooperating agency)

State Agencies

Department of Natural Resources
Colorado Division of Wildlife
Colorado State Clearing House, Division of Local Government
Colorado State Historic Preservation Officer

Local Agencies

Associated Governments of Northwest Colorado
Moffat County Commissioners
Moffat County Planning Director
Northwest Colorado Council of Governments
Rio Blanco County Commissioners
Rio Blanco County Planner

Major Special Interest Groups

Colorado Open Space Council
Colorado Wildlife Federation
National Wildlife Federation
Sierra Club
Western Colorado Congress
Western Organization of Resource Councils

Other Organizations and Individuals

Numerous organizations and individuals expressing interest in the proposed action have been sent copies of this statement and have been invited to comment.